

LDEQ-RECEIPT

Infrastructure, environment, facilities

2007 JUL 13 AM 9 20

Mr. Bijan Sharafkhani, P.E.
Administrator
Waste Permits Division
Office of Environmental Services
Louisiana Department of Environmental Quality
P. O. Box 4313
Baton Rouge, Louisiana 70821-4313

ARCADIS U.S., Inc. 10352 Piaza Americana Drive Baton Rouge Louisiana 70816 Tel 225.292.1004 Fax 225.218.9677 www.arcadis-us.com

ENVIRONMENT

Subject:

Submittal of Final Copies of Permit Renewal Application Storm Water Oil/Water Separator Treatment System Chevron Oronite Company, LLC, Belle Chasse, Louisia

Agency Interest No. 1708/PER20050009 GD-075-1511/Permit No. P-0112-A-1 JUL 1 3 2007

Date:

13 July 2007

Dear Mr. Sharafkhani:

On behalf of our client, Chevron Oronite Company, LLC (Chevron), ARCADIS is submitting six copies of the complete permit application for the above referenced facility. These copies were requested by the Louisiana Department of Environmental Quality - Waste Permits Division in a letter dated June 21, 2007.

Should you have any questions or require any additional information, please contact Mr. John Ellis at (225) 292-1004 or Mr. Troy Sampey of Chevron at (504) 391-6314.

Sincerely,

ARCADIS U.S., Inc.

./ _... _ _

Senior Scientist/Geologist

Senior Vice President/Area Manager

JE:RJG:egp

Attachments

Contact:

John Ellis

Extension; 208

Email:

john.ellis@arcadisus.com

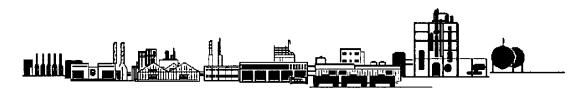
Our ref:

LA002582.0002.00001

Chevron/2582.2/C/3/egp



Oronite





SOLID WASTE PERMIT RENEWAL APPLICATION FOR STORM WATER TREATMENT SYSTEM

CHEVRON ORONITE COMPANY, LLC OAK POINT PLANT BELLE CHASSE, LOUISIANA AGENCY INTEREST NO. 1708 PER20050009 GD-075-1511 P-0112-A-1 13 July 2007

VOLUME II OF II



SOLID WASTE PERMIT RENEWAL APPLICATION FOR STORM WATER TREATMENT SYSTEM

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Appendix J

24-Hour/25-Year Rainfall Map

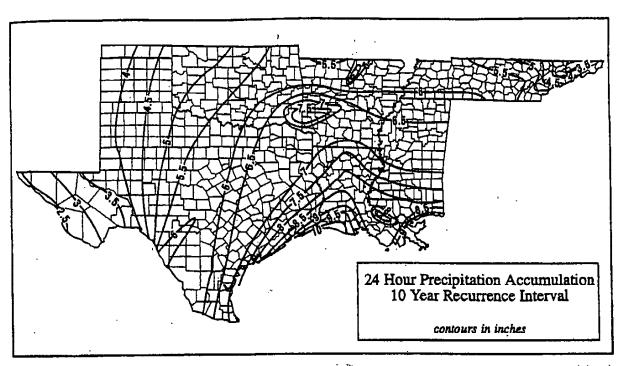


Fig. 6.3. 24-hour 10-year rainfall pattern.

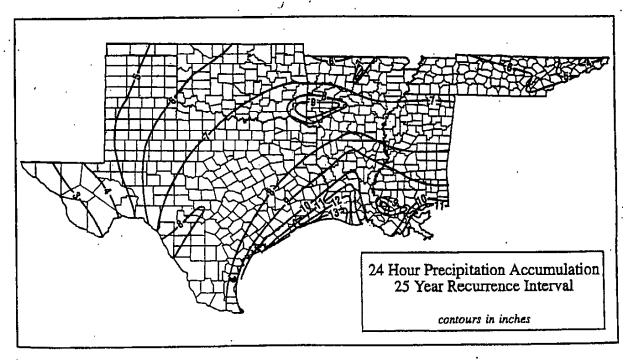


Fig. 6.4. 24-hour 25-year rainfall pattern.

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Appendix K

Geologic Summary of Aquifers in New Orleans, Louisiana

GEOLOGIC SUMMARY OF AQUIFERS IN GREATER NEW ORLEANS AREA

System	Scries	₹	Aquifer	Thickness (feet)	Description and Remarks (depth below land surface of top of aquifer, in feet)	Aquifer Characteristics	Water Quality
	Ногосепе		Point Bars	Variable; maximum 150	Fine to very fine sand and silt. Bars accumulate on inside of river bends. (10-60)	Poor prospect for development because of low hydraulic conductivity.	Generally very hard with high iron concentrations.
		Shallow Aquifers	Distributary Channel Deposits	Maximum 100	Fine sand. May contain organic debris. (5-10)	No aquifer test results.	Generally very hard with high iron concentrations.
			Isolated near-surface sands	Variable; maximum 180	Variable lithology. Sands occur locally and pinch out in short distances.	No aquifer test results.	Variable depending on location. Generally contain salty, very hard water.
Quarternary	Pleistocene	Qu	Gramercy	0-150	Fine to coarse sand. Discontinuous with variable thickness; pinches out in eastern Orleans Parish. Hydraulically connected with the Mississippi River. (125-225)	Hydraulic conductivity 30-60 ft/day.	Generally salty water except in northwest corner of Jefferson Parish.
	-	4	Norco	0-275	Fine to medium sand. Variable thickness; pinches out in eastern Orleans Parish. (300-400)	Hydraulic conductivity 50-210 ft/day.	Generally salty water except for northwest corner of Jefferson Parish where fresh water has low hardness with pH between 75 and 80.
	-	Go New	Gonzales- New Orleans	150-300	Mostly fine to medium sand of uniform texture. Continuous throughout the area; pinches out to the east beneath coastal waters. (400-800)	Hydraulic conductivity 80-120 ft/day based on tests in Jefferson and Orleans Parishes.	Fresh water is soft and low in iron and manganese concentrations; pH averages about 8.0.
		ÇT.	1,200-foot" Sand	50-130	Fine to medium sand. Pinches out to the east beneath coastal waters. (800-1,200)	Hydraulic conductivity estimated 10-40 ft/day based on measurements of specific capacity.	Contains salty water except in northeast corner of Orkeans Parish.
Reference: "Gr	"Groundwater Da	ta for the M	ississippi River	Parishes in the Gr	"Groundwater Data for the Mississippi River Parishes in the Greater New Orleans Area, Louisiana, United States Geological Survey Water Resources,	United States Geological St	rvey Water Resources,

Basic Records No. 11, 1983.

Chev9/14

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Appendix L

Lithologic Logs, Well Construction Diagrams, and Geotechnical Investigation Results

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-13

Description	Dep (f	th t)	Thickness (ft)
Fill material - shell	0 -	1.5	1.5
Clay, sandy, soft to firm, gray; shell fragments	1.5 -	3	1.5
Clay, silty, soft, gray to greenish gray; organics	3 -	7.5	4.5
Clay, silty, very soft, gray; organics	7.5 -	12	4.5
Clay, silty, very soft, gray; organics; trace of sand	12 -	13.5	1.5
Clay, sandy, soft, gray	13.5 -	15	1.5
Clay, silty, very soft, gray	15 -	16.5	- 1.5
Clay, silty, very soft, gray; sand lenses.	16.5 -	18	1.5
Clay, silty, very soft, gray; shell frag- ments	18 -	22.5	4.5
Clay, silty, very soft, gray; sand lenses; shell fragments	22.5 -	25.5	3
Silt, sandy, very soft, gray	25.5 -	27	1.5
Sand, silty, loose to firm, gray	27 -	31	4
Sand, clayey, loose, gray	31 -	33	2
Clay, sandy, soft, gray	33 -	34.5	1.5



WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

Project Chevron - 1495BC1	Well
Town/City Belle Chasse	<u></u>
County Plaquemine	State LA
Permit No. NA	
Land-Surface Elevation	
and Datum NA feet	☐ Surveyed
	☐ Estimated
Installation Date(s) November	1981
Drilling Method Mud Rota	гу
_	
_	
Development Technique(s) and Date(s	· · · · · · · · · · · · · · · · · · ·
Fluid Loss During Drilling Water Removed During Development	
1	
Pumping Depth to Water NA	feet below M
Pumping DurationNAh	ours
Yield <u>NA</u> gpm	DateNA
Specific Capacity NA	_ gpm/ft
Well Purpose Initially LDNR Hazardous w	
well	
Remarks	
<u></u>	
	Town/City Belle Chasse County Plaquemine Permit No. NA Land-Surface Elevation and Datum NA feet Installation Date(s) November Drilling Method Mud Rota Drilling Contractor Eustis E Drilling Fluid Mud Development Technique(s) and Date(s NA Fluid Loss During Drilling Water Removed During Development Static Depth to Water NA Pumping Depth to Water NA Pumping Duration NA h Yield NA gpm Specific Capacity NA Well Purpose Initially LDNR Hazardous w well

CHEVRON CHEMICAL COMPANY OAK POINT PLANT SOLID WASTE GROUNDWATER MONITORING DATA

1) A copy of your ground water monitoring plan as proposed to or approved by Department of Environmental Quality. This is to include all appropriate hydrogeological data, historic and current potentiometric evaluations, scaled site maps displaying all monitoring wells and piezometers. Also include details of water level measurements, well purging, sampling, preservation, chain of custody and analyzes (only reference test methods).

The LDEQ approved our solid waste groundwater monitoring program. Our facility received a Solid Waste Permit (Permit No. P-0112-AI) on July 28, 1986. The following attachments contain the requested data:

Attachment #1: Hydrogeological data.

Attachment #2: Potentiometric data and location of monitor wells.

Attachment #3: Site maps.

Attachment #4: Sampling and analysis plan.

The approved groundwater monitoring network consists of one upgradient well and two downgradient wells for each facility as per section 7.3.3 of the Louisiana Solid Waste Rules and Regulations:

- Stormwater Oil/Water Separator- The upgradient well, MW-14, and the downgradient wells, MW-13 and MW-50 comprise monitoring for the separator. These wells are completed in the "30-foot aquifer". This is considered the uppermost aquifer and has been identified as a continuous layer of silty sand and underlying the facility at a depth of approximately 30 feet.
- Associated ditches- The upgradient well, MW-14, and the downgradient wells, MW-13 and MW-50 also comprise the monitoring for the ditches. These wells are completed in the "30-foot aquifer".
- Stormwater Impoundment Basin- The upgradient well, MW-15, and the downgradient wells, MW-16 and MW-17 comprise monitoring for the basin. These wells are also completed in the "30-foot aquifer".

Construction details of monitor wells MW-14, MW-13, M-50, MW-15, MW-16 and MW-17 are as follows:

Top of Casing Elevation/Land Surface Elevation (feet, MSL)	lotal Depth of Boring (Feet, below land surface)	Screen interval (Feet, below land surface)	PVC Well Diameter (inches)
8.93/6.93	36	29-34	2
7.78/5.78	34.5	26-31	2
5.91/3.91	37	29-34	2
11.73/9.73	49.5	13-18	2
10.47/8.47	49.5	20-25	2
10.91/8.91	35.5	27-32	2
	Elevation/Land Surface Elevation (feet, MSL) 8.93/6.93 7.78/5.78 5.91/3.91 11.73/9.73 10.47/8.47	Elevation/Land Surface Elevation (feet, MSL) 8.93/6.93 7.78/5.78 5.91/3.91 11.73/9.73 10.47/8.47 Boring (Feet, below land surface) 36 34.5 37 49.5 49.5	Elevation/Land Surface Elevation (feet, MSL) 8.93/6.93 7.78/5.78 34.5 5.91/3.91 37 11.73/9.73 49.5 10.47/8.47 Boring (Feet, below land surface) 8-93/6.93 36 29-34 26-31 29-34 11.73/9.73 49.5 13-18 10.47/8.47

eraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-14

Description	-	eth Et)		Thickness (ft)
ay, sandy, soft, gray to brown	0 -	-	1.5	1.5
Clay, silty, soft to very soft, gray; ganics	1.5 -	- 1	0.5	9
Clay, silty, soft to very soft, gray;	10.5	- 1	5	4.5
Sand, silty, loose to very loose, gray	15 -	- 2	1	6
lay, silty, soft, gray	21 -	- 2	2.5	1.5
Clay, silty, soft to very soft, gray; Thell fragments	22.5 -	- 2	8	5.5
Sand, silty, loose to firm, gray	28 -	- 3	0	. 2
and, silty, loose to firm, gray;		- 3:		3
d, silty, firm, gray		- 3		1.5
Sand, clayey, loose, gray	34.5 -	٠ .	0	1.5



WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

2 ft LAND SURFACE	Project Chevron - LA171.02 Well MW-14R Town/City Belle Chasse County Plaquemine State LA Permit No. NA
10 \(\frac{1}{4} \) inch diameter drilled hole Well casing, 2 inch diameter, Schedule 40 PVC Backfill Portland Cement/ Grout Bentonite Grout Bentonite Slurry 27 ft* pellets	Land-Surface Elevation and Datum NA feet Surveyed Estimated Installation Date(s) March 8-9, 1993 Drilling Method Hollow Stem Drilling Contractor Eustis Engineering Drilling Fluid NA Development Technique(s) and Date(s) NA
Well Screen. 2inchdiameterPVC,0.010_slot Gravel Pack Sand Pack Formation Collapse 34ft*34ft*	Fluid Loss During Drilling
Measuring Point is Top of Well Casing Unless Otherwise Noted. *Depth Below Land Surface	Prepared byKipper W. Montgomery

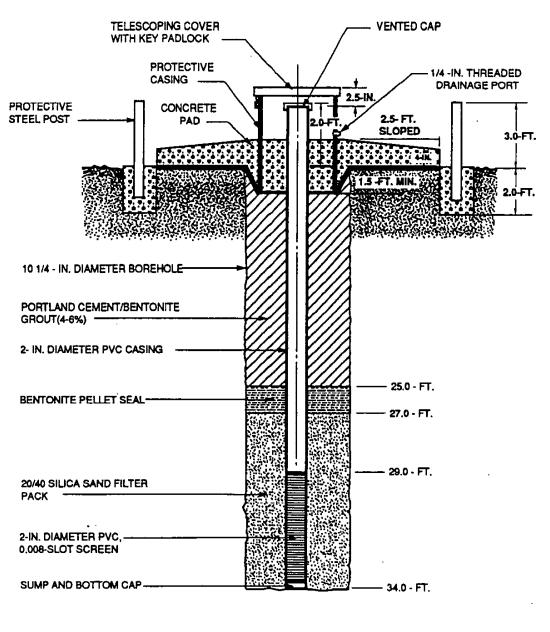
GERAGHTY & MILLER, INC. Environmental Services

TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-14R

PROJECT
CHEVRON CHEMICAL CO.
Belle Chase, Louisiana



NOT TO SCALE

NOTE: All Depth Measurements in Feet Below Ground Surface

CHEVRON CHEMICAL COMPANY OAK POINT PLANT SOLID WASTE GROUNDWATER MONITORING DATA

1) A copy of your ground water monitoring plan as proposed to or approved by Department of Environmental Quality. This is to include all appropriate hydrogeological data, historic and current potentiometric evaluations, scaled site maps displaying all monitoring wells and piezometers. Also include details of water level measurements, well purging, sampling, preservation, chain of custody and analyzes (only reference test methods).

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- Associated ditches- The upgradient well, MW-14, and the downgradient wells, MW-13 and MW-50 also comprise the monitoring for the ditches. These wells are completed in the "30-foot aquifer".
- Stormwater Impoundment Basin- The upgradient well, MW-15, and the downgradient wells, MW-16 and MW-17 comprise monitoring for the basin. These wells are also completed in the "30-foot aquifer".

Construction details of monitor wells MW-14, MW-13, M-50, MW-15, MW-16 and MW-17 are as follows:

Well	Top of Casing Elevation/Land Surface Elevation (feet, MSL)	Total Depth of Boring (Feet, below land surface)	Screen interval (Feet, below land surface)	PVC Well Diameter (inches)
MW-14	8.93/6.93	36	29-34	7
MW-13	7.78/5.78	34.5	26-31	2
MW-50	5.91/3.91	37	29-34	2
MW-15	11.73/9.73	49.5	13-18	2
MW-16	10.47/8.47	49.5	20-25	2
MW-17	10.91/8.91	35.5	27-32	2

WELL INFORMATION

MW-17	290 48' 50"	900 00' 37.5"	Detection	* *	DOWN	1.5	2" PVC	Sampling Pump	10.01	35.5	27	-2.34	10.9	9/18/86
MW-16	290 48' 50"	900 001 37.5"	Detection	* *	DOWN	9	2" PVC	Bailer	10.47	49.5	20	-2.53	12.2	9/18/86
MW-15	290 48' 50"	900 001 37,5"	Detection	* *	UP	16	2" PVC	Bailer	11.73	49.5	<u> </u>	1.9	4.3	9/18/86
MW-50	290 48' 50"	900 00' 37.5" 900 00' 37.5" 900 00' 37.5" 900 00' 37.5" 900 00' 37.5"	Detection	*	DOWN	10	2" PVC	Bailer	5.91	37	29	1.99	16.2	9/18/86
<u>MW-13</u>	290 48' 50"	900 00' 37.5"	Detection	*	DOWN	7.5	2" PVC	Bailer	7.78	34.5	26	3.78	15	9/18/86
MW-14	290 48' 50"	900 00' 37.5"	Detection	*	UP	5	2" PVC	Bailer	8.93	36	29	3.68	1.5	9/18/86
Parameters / Well Number	Latitude	Longitude	Type	Unit monitored	Up or down gradient	Monitored zone thickness	Construction	Sampling method	Casing elevation	Well depth	Screen interval, From	Elevation of water (MSL)	Gallons purged	Date sampled

* Solid Waste Stormwater Oil/Water Separator ** Solid Waste Stormwater Impoundment Basin

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-15

Description		ept (ft		Thickness (ft)
lay, sandy, soft to very soft, brown with red streaks	0	_	1.5	1.5
lay, silty, soft, gray to brown;	1.5	. -	3	1.5
Slay, silty, soft, gray to black; gray to black;	3	-	4.5	1.5
Clay, silty, very soft to firm, gray to greenish gray; sand lenses; organics	4.5	-	11	6.5
Silt, sandy, very soft to firm, gray to	11	-	18	7
Sand, silty, loose to firm, gray	18	-	27	9
No recovery	27	-	28.5	1.5
ay, silty, very soft, gray; shell agments	28.5	_	30	1.5
Clay, sandy, very soft to firm, gray	30	-	33	3
Sand, silty, loose, gray; trace of clay	33	_	35	2
Clay, silty, soft to firm, gray	35	-	36	1
Clay, silty, soft to firm, gray; trace of sand	36	-	37.5	1.5
Clay, silty, soft to firm, gray; sand lenses	37.5	-	40.5	3
Clay, sandy, soft to firm, gray	40.5	-	43.5	3
Clay, silty, soft, gray; sand lenses	43.5	-	46.5	3
Clay, silty, soft to very soft, gray	46.5	-	49.5	3
[]		•		

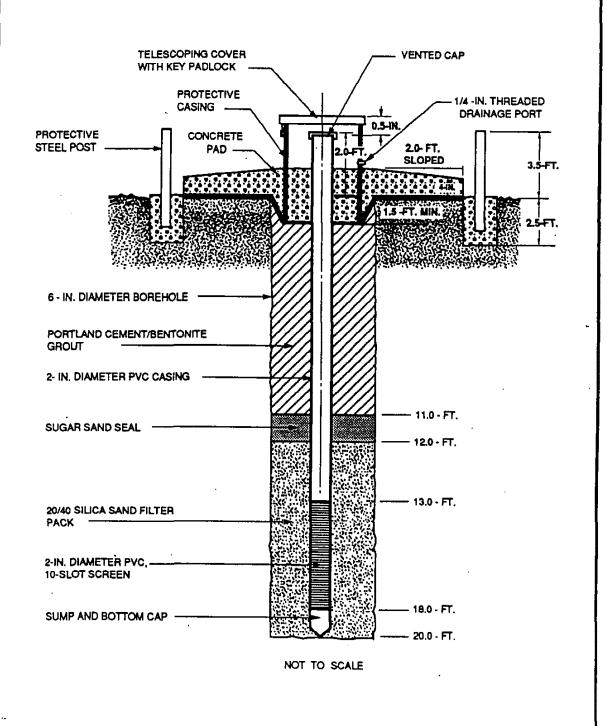
GERAGHTY
& MILLER, INC.
Environmental Services

TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-15

PROJECT
CHEVRON CHEMICAL CO.
Belle Chase, Louisians



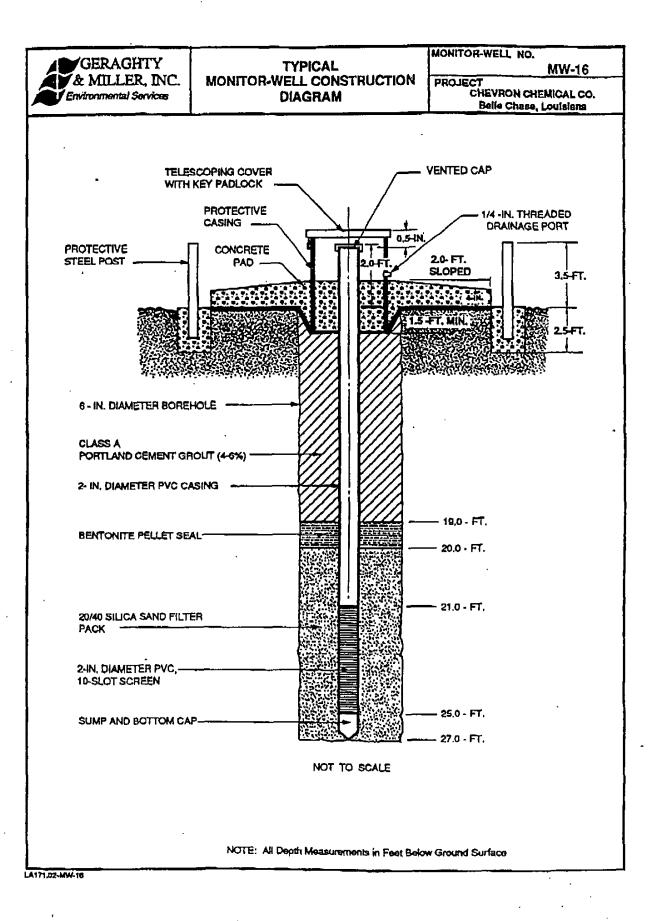
NOTE: All Depth Measurements in Feet Below Ground Surface

LA171.02-MW-15

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-16

Description		ft		Thickness (ft)
Clay, silty, soft to firm, gray to reddish brown; believed to be fill material; organics	0	_	6	6
Clay, silty, soft to firm, gray to brown; organics	6	_	12	6
Clay, silty, soft, gray to brown; organics; trace of sand	12	_	13.5	1.5
Clay, sandy, soft to very soft, gray; trace of silt	13.5	_	19.5	6
Silt, sandy, soft, gray	19.5	~	25.5	6
Clay, silty, soft, gray	25.5	-	27	1.5
lay, silty, soft, gray; shell fragments	27	_	30	3
Sand, silty, loose to very loose, gray	30	_	35.5	5.5
Clay, silty, soft to very soft, gray; sand lenses	35.5	_	49.5	14



SAMPLE/CORE LOG

r	Boring/Well	NU-16R	_ProjectNo./	Name İ	(-5789, L	UN#3		Page	of
	Site Location	BASIN	AREA		Drilling Started	4-/281	197	Drilling Completed	5/1/97
	Land-Surface	e Elev.		feet	☐ Surveyed	☐ Estimat	ted Datum		· - · · · · · · · · · · · · · · · · · ·
	Drilling Fluid (Used	Den	e		Drilling	Method Have	ow core.	NEFA
	Drilling Contra	actor 2	ZSTCS	ENGIN	TERINS	Driller Ph &	roh Besse	Helper	Y
	Prepared By	RCT			Hammer Wei	ght <u>VA</u>	Hammer [Drop WA	
	FI	Si C	lty	Silt	Sandy Silt	Silty Sand	Shelby Tube	> Water First E	incountered
	CI	s c	andy	Clayey Silt	Sand	Clayey Sand	Split Spoon	< Water Level	After 10 Mln.
	SAMPLE	SAMPLE	RECOVERY	SYMBOL		VISUAL	<u>,</u>		REMARKS
	DEPTH	TYPE	(FEET)			DESCRIPTION	NC		
	(FEET)								
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Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-17

Description	Depth (ft)	Thickness (ft)
Clay, silty, soft, gray; organics	19.5 - 21	1.5
Clay, silty, soft, gray; shell fragments	24.5 - 26	1.5
Clay, silty, soft, gray	29.5 - 31	1.5
Sand, silty, loose, gray	34 - 35.5	1.5



SAMPLE/CORE LOG

Boring/Well MW-17H Project/No CHEVRON CHEMICAL COMPANY (LAT71.02) Page 1 of 2 Site Belle Chasse, Louisians Drilling Started 11/30/92 10:15 Completed 11/30/92 15:00 Land-Surface Elev. feet Surveyed Estimated Datum Drilling Fluid Used None Drilling Method Hollow Stem Auger Drilling Contractor Eustis Engineering Driller Eric Helper Prepared Hammer NA Drop NA inches	_
Drilling Fluid Used None Drilling Method Hollow Stem Auger Drilling Contractor Eustls Engineering Driller Erlc Helper Prepared Hammer Hammer By Kipper Montgomery Weight NA Drop NA inches	-
Drilling Contractor Eustls Engineering Driller Eric Helper Prepared By Kipper Montgomery Weight NA Drop NA inches	-
Contractor Eustis Engineering Driller Eric Helper Prepared Hammer Hammer By Kipper Montgomery Weight NA Drop NA inches	-
Prepared Hammer Hammer By	
by noight stop indies	•
Fill Silty Clay Silt Sandy Silt Silty Sand Shelby Tube V Water First Encountered	i
	3
Clay Sandy Clay Clayey Silt Sand Clayey Sand Split Spoon ▼ Water Level After 10 Mi	n
AND SAMPH (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMMP (Feet) SYMP (Feet) SYMMP (Feet) SYM	
Clay, black and brown - silty (30/70), natural organics, stiff No soil samples collected.	
Well placed based on previous boring for MW-17	. 1
2 -	-
3 - \	-
4 - 1 /	7
5 — rootlets throughout	4
	1
- silt partings	
	1
" - \/	
- natural organics	٦
'' ~ \ ■	4
- some sand lenses	4
13 - \	4
14 \ \ / \	
15 —	
16	
17 -\\ • /\ • /\ • /\ • /\ • /\ • /\ • /\	7
	1
	1
	4
Silty day (25/75), soft, gray, natural organics throughout	4
21 - 1	4
22 - \	4
25	

GERAGHTY
& MILLER, INC. Environmental Services
Environmental Services

SAMPLE/CORE LOG

Jerean 30/40

oring/WellN	IW-17R	Project/No	CHEVRON CHE	EMICAL COMPAN	Y (LA171.02)		Page2 of2
te cation		sse, Louisiana		Drilling Started	11/30/92 10:15	Drillin	ng pleted 11/30/92 15:00
		feet	Surveyed	☐ Estimated	Datum		
illing Fluid Used		**	·				Hollow Stem Auger
illing		ustis Engineering		Driller			
ontractor epared				Unlier	Hammer		elper Hammer
	K	Ipper Montgomery	 		Weight	NA	Drop NA inches
	Silty Clay Sandy Clay	Silt Clayey Silt	Sandy Silt	Silty Sand	<u></u>	iby Tube t Spoon	✓ Water First Encountere✓ Water Level After 10 Mi
22 223			<u> </u>				
SAMPLE TYPE TYPE RECOVERY	SYMBOL		VISUAL DESCRIPTIO)N		USCS (LL/PL/PI)	REMARKS
- 1							No soil samples collected, Well placed based on previous boring for MW-17
				·			
		CII. 1 (00 00) 1					
-\ • /		Silty day (20/80), lig	nt gray, wet				
		Silty sand (30/70), gr	ray, wet	·· -			
		Total Depth 40 ft bl	5				
-							
-							
_							
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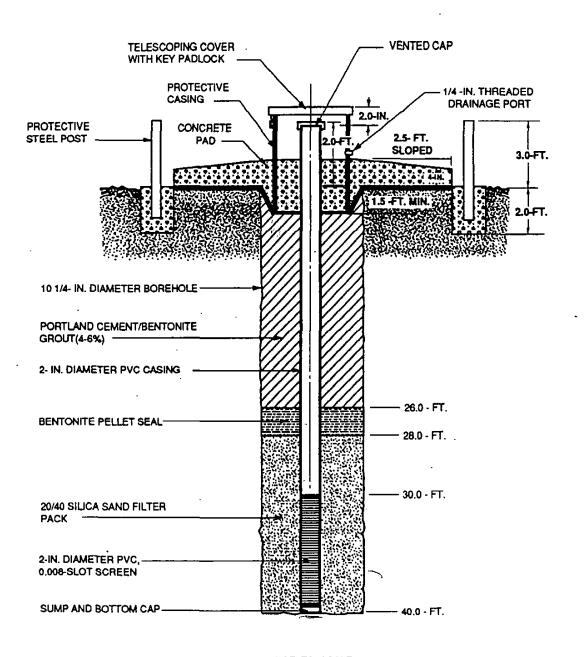


TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-17R

PROJECT
CHEVRON CHEMICAL CO.
Belle Chase, Louisians



NOT TO SCALE

NOTE: All Depth Measurements in Feet Below Ground Surface



WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

[] 7	Project Chevron - LA171.02 Well MW-17R
ft 2.5	Town/City Belle Chasse
LAND SURFACE	County Plaquemine State LA
ИИ .	Permit No. NA NA
10 ½ inch diameter	Land-Surface Elevation
drilled hole	and Datum NA feet Surveyed
Woll agains	□ Estimated
Well casing,inch diameter,	Installation Date(s) November 30, 1998 Z
Schedule 40 PVC	
Backfill Portland Cement/	Drilling Method Hollow Stem
Grout <u>Bentonite Gro</u> ut	Drilling Contractor <u>Eustis Engineering</u>
	Drilling Fluid NA
26 ft.	
Bentonite 🗆 slurry	Development Technique(s) and Date(s)
Bentonite ☐ slurry 28ft* ■ pellets	Hand bailed with teflon bailer - 12/01/92
	Fluid Loss During Drilling NA gallons
	Water Removed During Development 37 gallons
Well Screen.	Static Depth to Water NAfeet below M.P.
2 inch diameter PVC , 0.010 slot	Pumping Depth to Water NA feet below M.P.
	Pumping Duration NA hours
Gravel Pack	Yield NA gpm Date NA
■ Sand Pack· (20/40)	Specific CapacityNA gpm/ft
Formation Collapse	Well Purpose
	Replacement to old well MW-17
_40ft•	
_40	Remarks Total depth is at 45 ft bls. Formation
<u>40 </u> [["flowed" on us.
Measuring Point is	
Top of Well Casing	
Unless Otherwise Noted.	
*Depth Below Land Surface	
,	Prepared by Kipper W. Montgomery

eraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-18

Description	Dept (ft		Thickness (ft)
Clay, silty, soft to firm, gray to brown	0 -	4.5	4.5
Clay, silty, very soft to soft, gray to brown; organics	4.5 ~	15	10.5
Silt, sandy, loose to firm, gray	15 -	20	5
Sand, silty, firm, gray	20 -	24	4
Clay, silty, soft, gray; shell fragments	24 -	27	3
Clay, silty, very soft, gray; trace of sand	27 ~	28.5	1.5
Clay, silty, very soft, gray; sand lenses; shell fragments	28.5 -	30	1.5
Clay, silty, soft to firm, gray; shell fragments	30 -	31	1
Sand, silty, very loose to firm, gray	31 -	35.5	4.5
Clay, silty, soft, gray; sand lenses	35.5 -	40.5	5
Clay, sandy, soft, gray	40.5 -	42	1.5
Clay, silty, soft, gray	42 -	43.5	1.5
Clay, silty, very soft to stiff, gray; sand lenses	43.5 -	49.5	б



WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

	Project	Chevron -	LA171.0	2	Well	MW-18R
2 ft LAND SURFACE	Town/City	Belle	Chasse			
	County	Plaqu	<u>emine</u>		_ State_	LA
ИИ	Permit No	NA				
10 t inch diameter	Land-Surface	Elevation				
drilled hole	and Datum _	NA	feet		□ Surve	eyed
Well casing,					☐ Estim	•
2 inch diameter, Schedule 40 PVC	Installation Da	ate(s)	Decemb	er 1,	1992	
Backfill Portland Cement/						
Grout Bentonite Grout	-					
	Drilling Fluid					
20_ft*	Development					· •
Bentonite ☐ slurry	· ·		•			
22_ft" ■ pellets			·		·	
	Fluid Loss Du	ring Drilling		NA		gallo
23 ft*	Water Remov	red During D	evelopmen	t	NA	gallo
Well Screen.	Static Depth t	o Water		NA		feet below M.
2 inch diameter PVC 0.010 slot	Pumping Dep	th to Water_	· · · · · · · · · · · · · · · · · · ·	NA		feet below M.
PVC . D.010 slot	Pumping Dur	ationN	Α	hours		
Gravel Pack	Yield!	<u>NA</u> g	pm			Date <u>NA</u>
Sand Pack (20/40)	Specific Capa	acityN	Α	gpr	n/ft	
Formation Collapse	Well Purpose	 -				<u> </u>
	Replacer	ment to o	ld well A	1W-18		
	Remarks	Total de	oth is a	35 ft	bls.	
n						
}	·				<u>. </u> .	
Measuring Point is						
Top of Well Casing					<u> </u>	
Unless Otherwise Noted.		<u>.</u>		_		
*Depth Below Land Surface						
	Prenar	ed by	Kipper V	V. Mont	oomerv	

GERAGHTY
& MILLER, INC.

Environmental Services

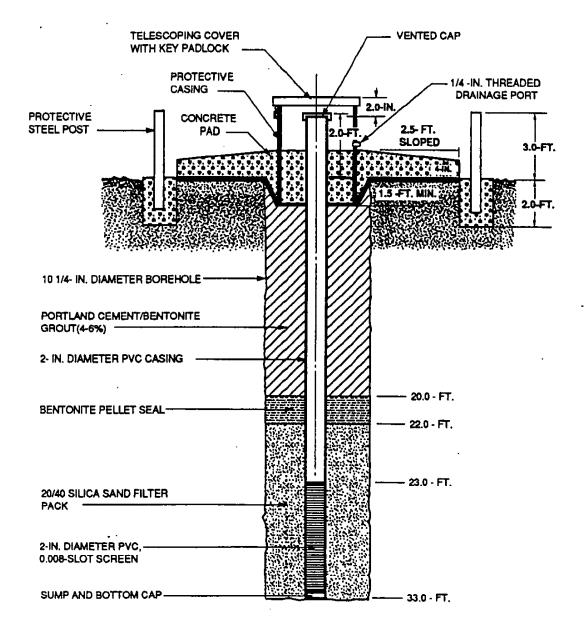
TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-18R

PROJECT

CHEVRON CHEMICAL CO.
Belle Chase, Louisiana



NOT TO SCALE

NOTE: All Depth Measurements in Feet Below Ground Surface

LA171.02-MW-18R

5 creen 23/33

GERAGHTY & MILLER, INC. Environmental Services

SAMPLE/CORE LOG

Boring/WellN	IW-18R Project/No.	CHEVRON CHEMIC	CAL COMPAN	Y (LA171.02)	·	Page 1 _ of 2
Site Location	Belle Chasse, Louisiana		Drilling Started	12/01/92 07:50	Drillin Com	ng pleted 12/01/92 9:30
Land-Surface Elev.	feet	☐ Surveyed ☐] Estimated	Datum	 -	
Drilling Fluid Used	None			Orilling I	Method	Hollow Stem Auger
Drilling Contractor	Eustis Engineering		Driller	Eric	Не	elper
Prepared By	Kipper Montgomer	у		Hamme Weight	NA_	Hammer Drop NA inches
(77)	Sitty Clay Sitt	Sandy Slit	Silty Sand	She	olby Tube	▼ Water First Encountered
Clay	шш	Sand	Clayey Sand	Spl	it Spoon	▼ Water Level After 10 Min.
SAMPLE DEPTH (Feet) SAMPLE TYPE TYPE	SYMBOL	VISUAL DESCRIPTION			USCS (LL/PL/PI)	REMARKS
0	Silty day (40/6)	O), dark brown, natural org				No soil samples collected. Well placed based on previous boring for MW-17.
20	Sand (20/80),	very fine, gray, wet, trace	of day			



SAMPLE/CORE LOG

Site Location Belie Chasse, Louisians Started	Hammer NA Hammer NA Drop NA Shelby Tube Water First	Auger inches
Land-Surface Elev	Drilling Method Hollow Stem A Eric Helper Hammer NA Drop NA Shelby Tube ▼ Water First Split Spoon ▼ Water Leve	inches
Contractor Eustis Engineering Driller Prepared By Kipper Montgomery Silty Clay Silty Sandy Silt Silty Sand Clay Sandy Clay Clay Silt Sand Clayey Sand	Hammer NA Hammer NA Weight NA Drop NA Shelby Tube Water First Split Spoon Water Leve	Encountered
Fill Silty Clay Silt Sandy Silt Silty Sand Clay Sandy Clay Clayey Silt Sand Clayey Sand Clayey Sand	Shelby Tube Water First Split Spoon Water Leve	Encountered
Clayey Sandy Clay Clayey Silt Sand Clayey Sand	Split Spoon Water Leve	
SAMPLE DEPTH (Feet) NOITHINGS SAMPLE TYPE TYPE TYPE TYPE TYPE TYPE TYPE TYPE	1 (
		IRKS
Clay, soft, silty (3%), gray, shell fragments	No soil sample Well placed previous boring	based on
28 - 29 - 30 - trace of sand, moist		. •
32 - 33 - 34 - Silty sand (35/65), loose, gray		
Total Depth 35 ft bis		
-		
		.•

GERAGHTY & MILLER, INC. Environmental Services

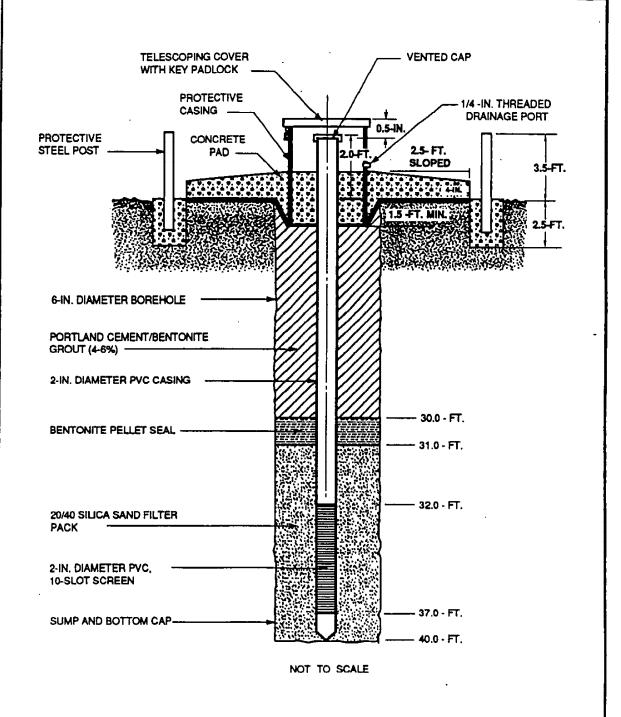
TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-50

PROJECT

CHEVRON CHEMICAL CO. Belle Chase, Louisians



NOTE: All Depth Measurements in Feet Below Ground Surface

CHEVRON CHEMICAL COMPANY OAK POINT PLANT SOLID WASTE GROUNDWATER MONITORING DATA

1) A copy of your ground water monitoring plan as proposed to or approved by Department of Environmental Quality. This is to include all appropriate hydrogeological data, historic and current potentiometric evaluations, scaled site maps displaying all monitoring wells and piezometers. Also include details of water level measurements, well purging, sampling, preservation, chain of custody and analyzes (only reference test methods).

The LDEQ approved our solid waste groundwater monitoring program. Our facility received a Solid Waste Permit (Permit No. P-0112-A1) on July 28, 1986. The following attachments contain the requested data:

Attachment #1: Hydrogeological data.

Attachment #2: Potentiometric data and location of monitor wells.

Attachment #3: Site maps.

Attachment #4: Sampling and analysis plan.

The approved groundwater monitoring network consists of one upgradient well and two downgradient wells for each facility as per section 7.3.3 of the Louisiana Solid Waste Rules and Regulations:

- Stormwater Oil/Water Separator- The upgradient well, MW-14, and the downgradient wells, MW-13 and MW-50 comprise monitoring for the separator. These wells are completed in the "30-foot aquifer". This is considered the uppermost aquifer and has been identified as a continuous layer of silty sand and underlying the facility at a depth of approximately 30 feet.
- Associated ditches- The upgradient well, MW-14, and the downgradient wells, MW-13 and MW-50 also comprise the monitoring for the ditches. These wells are completed in the "30-foot aquifer".
- Stormwater Impoundment Basin- The upgradient well, MW-15, and the downgradient wells, MW-16 and MW-17 comprise monitoring for the basin. These wells are also completed in the "30-foot aquifer".

Construction details of monitor wells MW-14, MW-13, M-50, MW-15, MW-16 and MW-17 are as follows:

We <u>ll</u>	Top of Casing Elevation/Land Surface Elevation (feet, MSL)	Total Depth of Boring (Feet, below land surface)	Screen interval (Feet, below land surface)	PVC Well Diameter (inches)
MW-14	8.93/6.93	36	29-34	2
MW-13	7.78/5.78	34.5	26-31	2
MW-50	5.91/3.91	37	29-34	2
MW-15	11.73/9.73	49.5	13-18	2
MW-16	10.47/8.47	49.5	20-25	2
MW-17	10.91/8.91	35.5	27-32	2

WELL INFORMATION

26 29 13 20 26 29 13 20 31 34 18 25 3 3.78 1.99 -1.9 -2.53 15 16.2 4.3 12.2 86 9/18/86 9/18/86 9	Parameters / Well Number Latitude Longitude Type Up or down gradient Monitored zone thickness Construction Sampling method Casing elevation	14 50" 37.5" 9 110n 110n	MW-13 29° 48' 50" 00° 00' 37.5" Detection * DOWN 7.5 2" PVC Bailer 7.78	MW-50 290 48' 50" 900 00' 37.5" Detection * DOWN 10 2" PVC Bailer 5.91	AW-13 MW-50 MW-15 MW-16 48' 50" 290 48' 50" 290 48' 50" 290 48' 50" 00' 37.5" 900 00' 37.5" 900 00' 37.5" 900 00' 37.5" stection Detection Detection Detection * * ** ** SOWN UP DOWN 7.5 10 16 6 " PVC 2" PVC 2" PVC Bailer Bailer Bailer Bailer 7.78 5.91 11.73 10.47	290 48' 50" 290 48' 50" 900 00' 37.5" Detection ** 6 2" PVC Bailer 10.47	2900 900 De De
26 29 13 20 31 34 18 25 3.78 1.99 -1.9 -2.53 15 16.2 4.3 12.2 9/18/86 9/18/86 9/18/86 9/18/86		36	34.5	37	49.5	49.5	35.5
3.78 1.99 -1.9 -2.53 15 16.2 4.3 12.2 9/18/86 9/18/86 9/18/86	From To	29	31	29 34	13	20 25	27
15 16.2 4.3 12.2 9/18/86 9/18/86 9/18/86	Elevation of water (MSL)	3.68	3.78	1.99	-1.9	-2.53	-2.34
9/18/86 9/18/86 9/18/86		15	15	16.2	4.3	12.2	10.9
			98/81/6	9/18/86	9/18/86	98/81/6	9/18/86

* Solid Waste Stormwater Oil/Water Separator ** Solid Waste Stormwater Impoundment Basin

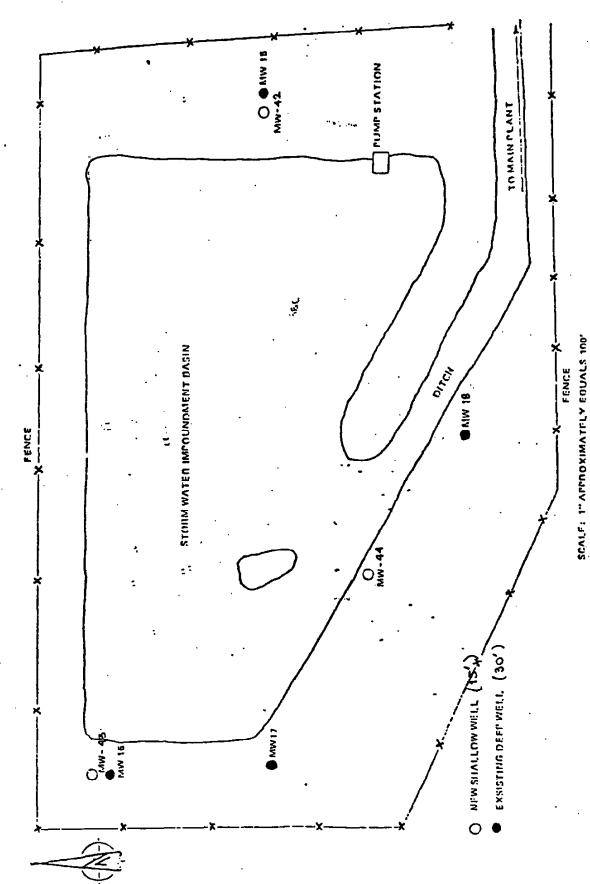


Figure 2. LOCATION OF MONITORING WELLS FOR STOAM WATER IMPOUND.
MENT DASIN

- TABLE 1

MONITORING WELL INSTALLATION LOG

MW-42

Date Drilled: 6/27/83

Location: Adjacent to MW 15

Stratigraphy: 0 - 12 ft. Moderately dense grey clay with traces of sand.

Well Construction:

Installed 5 ft. of 1.25-inch PVC screen and 10 ft. of 1.25-inch PVC casing. Put 12 inches coarse sand in the bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 12-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 9.80 ft. above msl.

MW-43

Date Drilled: 6/27/83

Location: Adjacent to NW 16

Stratigraphy: 0 - 0.5 ft. Brick and other debris.

0.5 - 12 ft. Same as MW-42.

Well Construction:

Installed 5 ft. of 1.25-inch PVC screen and 10 ft. of 1.25-inch PVC casing. Put 12 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 12-inch tentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 8.91 ft. above msl.

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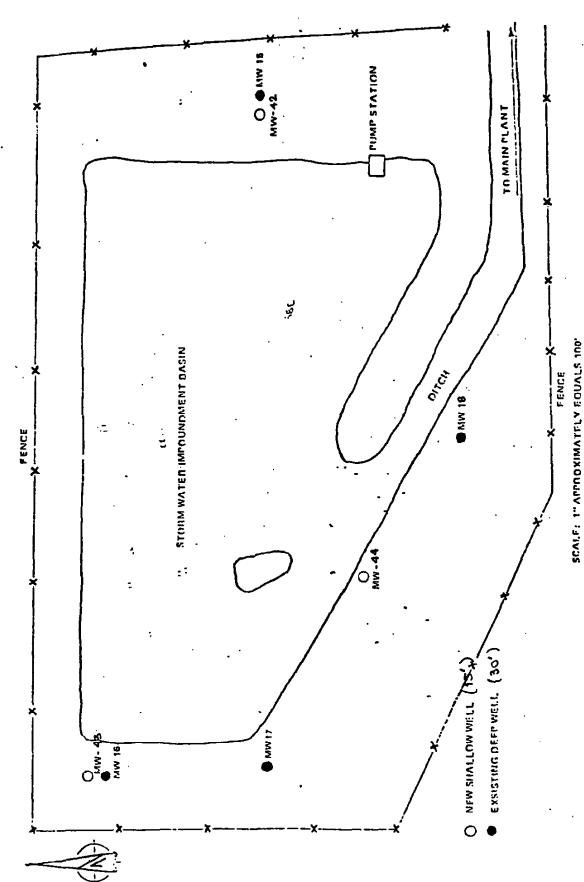


Figure 2. LOCATION OF MONITORING WELLS FOR STORM WATER IMPOUND. MENT BASIN

TABLE 2

MONITORING WELL INSTALLATION LOS

MW-42

Date Drilled: 6/27/83

Location: Adjacent to MW 15

Stratigraphy: 0 - 12 ft. Moderately dense grey clay with traces of sand.

Well Construction:

Installed 5 ft. of 1.25-inch PVC screen and 10 ft. of 1.25-inch PVC casing. Put 12 inches coarse sand in the bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 12-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 9.80 ft. above msl.

MW-43

Date Drilled: 6/27/83

Location: Adjacent to MW 16

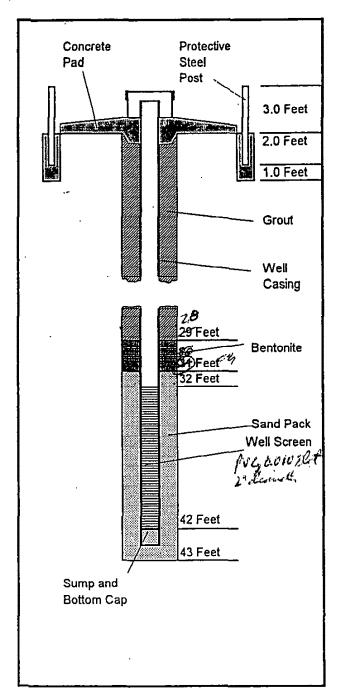
Stratigraphy: 0 - 0.5 ft. Brick and other debris.

0.5 - 12 ft. Same as MW-42.

Well Construction:

Installed 5 ft. of 1.25-inch PVC screen and 10 ft. of 1.25-inch PVC casing. Put 12 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 12-inch tentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 8.91 ft. above msl.

WELL CONSTRUCTION LOG



Project <u>N-5389.W4#3</u> Well MU-UR
Town/City Action Entre To VERLENCE
Parish PURETURES State LA
Installation Date(s) <u>9 4-27-97</u>
Drilling Method Hallow Stan Arger
Contractor Centres Engineering
Drilling Fluid None
Development Technique(s) and Date(s) Hand Last Carlos (5/247)
Panded (5/13/97)
Water Removed During Develoment
Well Purpose Grandwood, Monding work-
Remarks
Prepared by RC Thungan

SAMPLE/CORE LOG

	Boring/Well /	MUL-161	$\frac{9}{2}$ ProjectNo.	/Name	15/1					Page/_	of
	Site Location	BAS	710		Drill Star	_	·		 -	Drilling Completed	
	Land-Surface	e Elev.		_feet	□ Sun	veyed	□ Estima	ated (Datum		
	Drilling Fluid	Used					Drilling	Metho <u>d</u>			
	Drilling Contra	actor	· .				Driller		_	Helper	
	Prepared By	-			Hamme	Maiaht			Hammer D		
	riepaied <u>by</u>		[[]]							гор	
	FI	ill C	ilty	Silt	San Silt	dy 📑	Silty Sand		Shelby Tube	> Water First E	ncountered
	Cl		andy ///	Clayey :: Silt ::	Sar	nd Z	Clayey Sand		Split Spoon	< Water Level	After 10 Min.
	SAMPLE	SAMPLE	RECOVERY	SYMBOL			VISUAL				REMARKS
	DEPTH	TYPE	(FEET)	ļ	}		DESCRIPTI	ON			
	(FEET)										
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34.	1	4	Clay 1	5,x 64 5			<u> </u>	F)		
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SAMPLE/CORE LOG

	Boring/Well /	MU-16R	ProjectNo./	Name Ì	(-5389, W)	#3		Page	of
	Site Location	BASIN	AREA		Drilling Started	4/28/97		Drilling Completed	5/1/87
	Land-Surface	e Elev.	· · · · · · · · · · · · · · · · · · ·	feet	☐ Surveyed	☐ Estimated ·	Datum		
	Drilling Fluid I	Used	Den	٤		Drilling Metho	d Norwe	U CORET A	newa
	Drilling Contra	actor L	25705	ENG-IN	tering-	Driller Pharch	Bessett	د Helper	·4
	Prepared By	RCT			Hammer Weight	NA	Hammer Drop	NA	
		Si	ty IIII	Silt	Sandy Silt	Silty Sand	Shelby Tube >	Water First E	ncountered
	CH	Sa Cl	ndy //	Clayey Silt	Sand 7	Clayey Sand	Split Spoon <	Water Level /	After 10 Mln.
	SAMPLE	SAMPLE	RECOVERY	SYMBOL		VISUAL			REMARKS
	DEPTH	TYPE	(FEET)			DESCRIPTION			
	(FEET)	101		<u></u>					
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GEOTECHNICAL INVESTIGATION

CHEVRON CHEMICAL COMPANY

OAK POINT PLANT

STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

CONTRACT NO. K-7435

EUSTIS ENGINEERING PROJECT NO. 18916

FOR CHEVRON CHEMICAL COMPANY BELLE CHASSE, LOUISIANA

By
Eustis Engineering Company, Inc.
Metairie, Louisiana

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GEOTECHNICAL INVESTIGATION

CHEVRON CHEMICAL COMPANY

OAK POINT PLANT

STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

CONTRACT NO. K-7435

EUSTIS ENGINEERING PROJECT NO. 18916

INTRODUCTION

- This report contains the results of a geotechnical investigation performed for the proposed stormwater pumping station at Chevron Chemical Company's Oak Point Plant in Belle Chasse, Louisiana. The investigation was performed in general accordance with Eustis Engineering Company, Inc.'s proposal dated 18 May 2005. Authorization to proceed was given through Chevron Chemical Company Contract No. K-7435 dated 21 May 2005.
- 2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of Chevron Chemical and their designated representatives for specific application to the subject site. In the event of any changes in the nature, design, or location of the proposed structure, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified and verified in writing. Should these data be used by anyone other than Chevron Chemical and their designated representatives, they should contact Eustis Engineering for interpretation of data and to secure any other information pertinent to this project.

- 3. The analyses and recommendations contained in this report are based in part on data obtained from the soil boring. The nature and extent of variations in subsoil conditions away from the boring location may not become evident until construction. If variations then appear, it will be necessary to reevaluate the recommendations contained in this report.
- 4. Recommendations and conclusions contained in this report are to some degree subjective and should be used only for design purposes. This report should not be included in the contract plans and specifications. However, the results of the soil boring and laboratory tests contained in the Appendix of this report may be included in the plans and specifications.

SCOPE

5. The investigation included the drilling of a soil test boring to evaluate subsoil conditions and stratification, and to obtain samples of the various substrata. Soil mechanics laboratory tests, performed on samples obtained from the boring, were used to evaluate the physical properties of the subsoils. Engineering analyses, based on the soil boring and laboratory tests, were made to develop allowable pile load capacities, estimates of settlement, and general construction recommendations. An evaluation of the stability of the stormwater impoundment basin bank was also performed. In addition, analyses were performed to develop recommendations for a proposed cofferdam.

SOIL BORING

One undisturbed sample type soil test boring, 75 feet in depth, was made at the site on 23 May 2005. The approximate location of the boring is shown on Figure 1. A detailed descriptive log of the boring and laboratory tests is shown in both tabular and graphical form in the Appendix. Upon completion of drilling the boring, the hole was backfilled with cement-bentonite grout in accordance with current regulatory requirements.

<u>Undisturbed Boring</u>

- 7. The undisturbed soil boring was made with a truck mounted rotary type drill rig. Undisturbed samples of cohesive or semi-cohesive subsoils were obtained at close intervals or changes in strata using a 3-in. diameter thinwall Shelby tube sampler. The samples were immediately extruded from the sampler, inspected, and visually classified by Eustis Engineering's soil technician. Pocket penetrometer tests were performed on the soil samples to give a general indication of their shear strength or consistency. The results of these tests are shown on the boring log under the column heading "PP." Representative samples were then promptly placed in moisture proof containers and sealed for preservation of their natural moisture content.
- 8. Samples of cohesionless and semi-cohesive materials were obtained during the performance of in situ Standard Penetration Tests. This test consists of driving a 2-in. diameter sampler 1 foot into the soil after first seating it 6 inches. A 140-lb weight dropped 30 inches is used to advance the sampler. The number of blows required to drive the sampler is indicative of the relative density of cohesionless soils and the consistency of cohesive soils. The samples were retained in moisture proof containers for preservation of their natural moisture content. The results of the Standard Penetration Tests are shown on the boring log under the column heading "SPT."

LABORATORY TESTS

9. Soil mechanics laboratory tests, consisting of natural water content, unit weight, and either unconfined compression shear (UC) or one-point unconsolidated undrained

triaxial compression shear (OB), were performed on samples obtained from the undisturbed boring. The results of the laboratory tests are summarized on the boring log in the Appendix.

10. A grain size analysis was also performed on a selected sample of cohesionless soil obtained from the boring to determine its particle distribution (PD) curve. The results of this test are shown on a separate sheet following the boring log in the Appendix.

DESCRIPTION OF SUBSOIL CONDITIONS

<u>Topography</u>

11. The pumping station structure will be located approximately 30 feet into the stormwater impoundment basin. At the proposed location of the station, the mudline is at approximate el -3.5 to el -6.7 (MSL). Boring 1 was made at the top of the bank of the basin at approximate el 8. Water levels within the impoundment fluctuate between el 0 and el -4.

Stratigraphy

12. Reference to the log of the boring indicates approximately 6 inches of compact white shells were encountered and are underlain by 18 inches of medium dense brown silty sand with clayey silt layers. Medium stiff gray and tan silty clay and clay were encountered to the 11-ft depth followed by medium compact gray sandy silt and clayey silt to the 18.5-ft depth. Deposits of medium dense gray silty sand were then encountered to the 26-ft depth. Very soft to medium stiff gray clay and silty clay were then encountered to the final boring depth of 75 feet below the existing ground surface. A stratum of loose gray clayey silt with sandy silt layers was encountered between the 36 and 41-ft depths.

Ground Water

13. In order to determine the ground water conditions at the time of the field investigation, observations were made in an auger boring drilled approximately 4 feet north of the boring. The boring was advanced without the addition of water to a depth of 15 feet. Free water was initially encountered at a depth of 12 feet. After a period of approximately six hours, the hole was observed to be dry and caved at a depth of 11 feet. The depth to ground water will vary with climatic conditions, drainage improvements, levels in the stormwater impoundment basin and nearby Mississippi River, and other factors. The depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

FOUNDATION ANALYSIS

Furnished Information

14. A layout of the proposed structure was furnished by Chevron Chemical. The project will consist of a pile supported stormwater pumping station located within the stormwater impoundment basin. The pumping station will have plan dimensions of approximately 17' x 19' and will support two 3,000-gpm pumps. Structural loads are estimated to be approximately 25 tons. The structure is to be supported on six 8-in. diameter steel pipe piles. Piping will be required from the pumping station to the bank of the basin. A pile supported bent will be constructed between the station and the bank for support of the piping. Minimum pile spacings were furnished as 7 feet, 8 inches. Piping at the bank will be grade supported. Beneath the station platform, a sump will be excavated to approximate el-11 (MSL). The cofferdam will have approximate plan dimensions of 20' x 20'. A vibratory hammer will be utilized to install all piles, casing, and sheetpiles. Eustis Engineering was furnished a

proposed construction plan contained in Chevron Chemical's letter to the State of Louisiana, Department of Environmental Quality, dated 31 May 2005.

Foundation Recommendations

- Our recommendations assume the furnished construction plan will be followed. Should changes be made to the proposed construction sequence, Eustis Engineering should be contacted to reevaluate the recommendations contained in this report. The proposed structures may be supported on deep foundations consisting of the proposed 8-in. diameter open end steel pipe piles. All structural loads from each feature should be supported on piles having the same tip embedments in order to minimize differential settlement. We understand project requirements will not allow for performance of a static load test over dynamic pile testing. Therefore, we recommend a factor of safety of 2.5 be used for pile foundations.
- 16. In order to provide cutoff of permeable substrata, we recommend casing and sheetpiles be installed to at least el -23, though deeper embedments may be required for structural considerations as provided herein.
- 17. Recommendations are not provided for the piping that crosses the roadway on the southern side of the impoundment. These features were installed prior to this investigation.

Deep Foundations

18. <u>Allowable Pile Load Capacities.</u> Analyses have been made to determine the estimated allowable single pile load capacities in compression and tension for 8-in. diameter open end steel pipe piles for support of the proposed structures. The results of these analyses are shown on Figure 2.

- 19. Our allowable pile load capacities neglect the capacity to el -23 for embedment of the pile within the casing and grouting procedures as outlined in the proposed construction sequence. These allowable pile load capacities also contain an estimated factor of safety of 2.5 against failure of a single pile through the soil. The allowable pile load capacities shown on Figure 2 also include a 20% reduction for installation by a vibratory hammer.
- 20. Open End Steel Pipe Piles. We recommend the open end steel pipe piles meet the requirements outlined in Section 1013.11 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition (LSSRB). The steel piles should be designed to have wall thicknesses that are structurally sufficient to withstand handling and driving stresses. The pile dimensions assumed in our analyses are based primarily on the outside pile diameter. The actual wall thickness selected for the open end pile will generally not affect our estimated vertical capacities.
- 21. <u>Protrusion of Connections or Welds.</u> Pile connections that protrude beyond the surface of the outside wall of the pile reduce the frictional resistance acting on the pile surface above the protrusion. For this reason, we recommend against the use of spiral welded piles and closed end pipe piles. We further recommend all pile welds be ground flush with the surface of the pile.
- 22. <u>Structural Capacity.</u> Analyses for pile capacities are based on a soil-pile relationship only. Therefore, the structural capacity of the piles and their connections to transmit these loads should be determined by a structural engineer. The estimates of pile capacities presented herein do not include the weight of the pile.
- 23. <u>Pile Group Capacity</u>. Eustis Engineering has reviewed the furnished pile layout plan. For the proposed layout, the effects of group action on the basis of group perimeter shear with regards to vertical pile capacity should be minimal and the

allowable pile load capacity may be taken as the sum of the individual pile load capacities. The proposed spacing of the piles exceeds minimum spacing requirements. Should pile spacing or group dimensions differ from those furnished, Eustis Engineering should be contacted to reevaluate the effects of group action.

- 24. Estimated Settlement Due to Structural Loads. We recommend the structure be constructed as rigidly as possible to minimize the potential for differential settlements. Based on the furnished pile layout, we estimate settlement of piles with minimum embedments to el -40 to be 1/4 to 1/2 inch due to furnished structural loads.
- 25. These estimates do not include elastic deformation of the piles which should be added to the settlement estimates. Elastic deformation of the piles may be estimated as 67% to 75% of the static column strain of a pile acting as a column. These estimates of settlement are due to structural loads only.
- 26. <u>Differential Settlement.</u> Your design should recognize the potential for differential settlement between pile supported features and grade supported features. A joint allowing vertical movements should be provided between any grade supported and pile supported features to accommodate potential differential settlement. In addition, the structure should be designed as rigidly as possible to minimize the potential for differential settlement.

Installation of Piles and Casing

27. Quality Control. We understand piles and casing will be installed using vibratory equipment. Close field supervision should be maintained by experienced personnel to ensure proper procedures are followed and accurate records are kept for all pile installation operations. The installation record should include, as a minimum, the date, the start and end times of individual pile installation, the type and size of pile.

overall length, inner and outer diameters, wall thickness, embedment below a reference datum, depth and diameter of casing, depth and diameter of prepunch or predrill, and hammer type. An accurate installation record is especially important to verify the piles are installed to the required tip embedment and that all other specifications have been met.

- 28. Predrilling. Predrilling may be required to aid in installation of casing through underlying sand deposits. Based on the boring log, the relative density of these deposits is medium dense and should not create significant driving problems for steel casing installed using vibratory methods. However, the project specifications should address the potential for predrilling. Due to the variable nature of the deposits, high penetration resistances should be anticipated. A pilot hole has the potential of minimizing vibrations resulting from pile installation operations or reducing the potential damage to piles. The predrill bit should be no larger than approximately 80% of the diameter for pipe piles. Predrilling should be made by wet rotary methods. Predrilling should not extend beyond el -20. Eustis Engineering should be contacted if a deeper pilot hole is necessary.
- 29. <u>Dynamic Analysis</u>. The steel pipe piles should be designed by a structural engineer to have a cross-section which is structurally sufficient to facilitate driving of the piles without damage. Dynamic analyses (WEAP) can be performed to evaluate driving stresses and driveability once the hammer and appurtenant equipment have been selected. Structural requirements can then be verified by a structural engineer and installation criteria can be established.

Slope Stability

30. <u>Design Methodology and Assumptions.</u> Excavation for the proposed sump will affect the stability of the basin bank. A cross-section of the bank was provided by Chevron Chemical. Stability analyses were performed using the U.S. Army Corps

of Engineers' UPLIFT program which incorporates the LMVD Method of Planes Analysis. A factor of safety of 1.3 is typically required for bank stability. This method utilizes a plane-strain evaluation of slope stability which assumes the excavation with infinite extent in the direction parallel to the bank. In reality, the excavation is relatively narrow in the direction parallel to the bank. Therefore, in cases where the LMVD Method of Planes Analysis indicates a factor of safety of less than 1.3, a conservative three-dimensional analysis assuming a triangular distribution was performed to consider the excavation in three dimensions. This method is described on Figure 4. The design parameters selected are shown on the stability plates provided as Figures 3 and 4. A low water level in the basin at el -4 was furnished by Chevron Chemical for use in our analyses. Our analyses consider an excavation having plan dimensions of 20' x 20' to el -11.

31. Our analyses indicate global stability of the bank, with regards to failure into the basin, exists at a factor of safety of approximately 1.38 for the current bank configuration. The results of these analyses are shown on Figure 3. Considering an infinitely wide excavation to el -11 for the sump, we estimate the factor of safety to be 1.13. Results of the three-dimensional analysis show a minimum calculated factor of safety of 1.32. Our results of the three-dimensional analysis, shown on Figure 4, consider an excavation having plan dimensions of 20' x 20'. Should low water levels below el -4 be proposed, Eustis Engineering should reevaluate bank stability.

<u>Cofferdam</u>

(

32. Sheetpile Wall. We have analyzed the southern wall of the cofferdam which is the wall supporting the greatest earth load. Ground surface elevations on the northern and southern walls of the cofferdam are shown on Figure 4. Our analyses assume the top of the sheetpile sections to be at approximate el 0 and the bottom of the excavation to be at el -11. Furnished information indicates the excavation will not

be dewatered and low water levels were assumed at el -4. Based on these analyses, the sheetpiles should extend to el -40 (approximate 40-ft sheetpiles). This penetration contains a factor of safety of approximately 1.3 applied to the soil parameters. We estimate the maximum bending moment in the sheetpile sections to be 19.5 kips-ft per linear foot of wall acting at approximate el -16. The moment diagram is shown on Figure 5. The maximum scaled deflection is estimated to be 6.7 x 10⁹ lb-in³. To obtain deflection in inches, divide scaled deflection by the product of the modulus of elasticity (psi) and the moment of inertia (in.⁴). Our estimate of deflection does not consider support from the proposed H-Beam frame. Our analyses also assume adhesion of the soil to the steel sheetpiles equal to 50% of the undrained shear strengths. The net pressure diagrams for the southern walls are shown on Figures 6 and 7 for the factored and unfactored conditions, respectively.

33. The selected sheetpile sections should be sufficient to withstand installation requirements. Sheetpiles should be installed as recommended in Section 803 of the LSSRB. The sheetpiles should have interlocks to minimize erosion of soils into the sump. Your structural engineer should select a sheetpile section that is sufficient to provide the above mentioned moment capacity. Our recommendations for moment and deflection do not contain factors of safety. Applicable factors of safety should be applied when analyzing the sheetpiles. Should the cofferdam require dewatering or water levels below el -4, the above recommendations should not be considered valid and Eustis Engineering should be contacted to evaluate the proposed system.

<u>Vibrations</u>

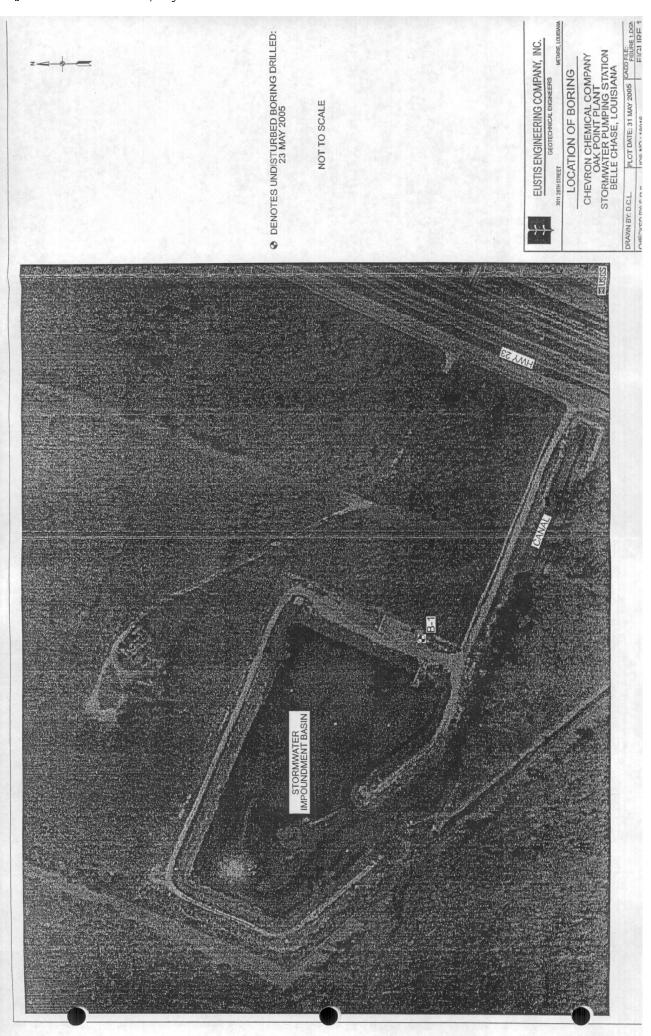
34. <u>General.</u> Pile driving and sheetpile installation, as well as other construction activities, have the potential to generate vibrations that may affect nearby structures, pavements, and underground utilities. If vibrations are a concern, Eustis

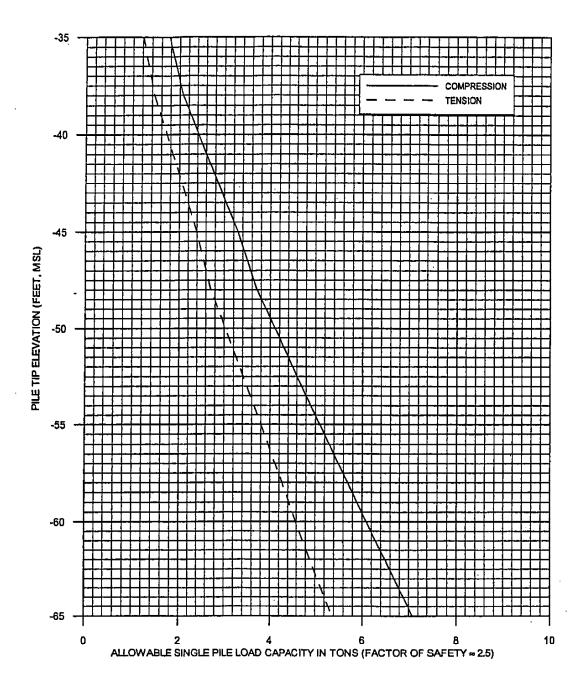
Engineering recommends vibrations be monitored during the test pile program and during subsequent construction activities of concern. This monitoring should evaluate peak particle velocities during pile driving at critical structures with a seismograph, as well as other construction activities generating vibrations (hauling of fill, moving heavy equipment, etc.). The record of peak particle velocities will provide information in assessing potential damage and the need for changes in construction operations.

- 35. Measurement. If vibrations are a concern, we recommend peak particle velocities due to construction operations be monitored at critical structures or pavements with a seismograph during all construction operations that have a potential to cause vibrations. The record of peak particle velocities will provide information in assessing potential damage and the types of changes best suited to the project requirements.
- 36. Generally, peak particle velocities of 1.5 to 2.0 in./sec are considered to be threshold levels for structural damage. Low peak particle velocity levels can also be a problem for poorly constructed structures that have been previously stressed by settlement or other movements. In such cases, vibrations on the order of 0.5 in./sec can initiate cosmetic damage or further cosmetic damage that has already taken place in the structure. Peak particle velocities between 0.25 and 0.5 in./sec may be sensed as being detrimental by human perception. In addition, peak particle velocities of 0.25 in./sec may densify cohesionless or semi-cohesive deposits (such as fill materials) and result in settlement of structures founded in these materials. Considering the potential for cosmetic damage and the adverse perception to human response, we recommend a level of 0.5 in./sec be set as a construction tolerance for transient construction activities. This level is generally achievable with current construction methods. However, for sustained peak particle velocities in excess of 0.25 in./sec at a pavement, utility, or structure of concern. Eustis Engineering should be notified.

ADDITIONAL GEOTECHNICAL SERVICES

- 37. To provide continuity between the investigation, design, and construction phases, Eustis Engineering should be retained to provide additional services during completion of the project. These services may include consultation during design and construction, providing inspection of excavations, reviewing design plans and construction sequences proposed by the contractor, logging the installation of job piles, concrete testing and inspection, steel inspection, and any other soils and materials testing services. Eustis Engineering offers a complete range of materials testing services which will provide quality control during construction and conformance to design specifications. Eustis Engineering can also perform DPT during installation and evaluate PDA data with respect to driving stresses, load capacity, and pile integrity.
- 38. In summary, Eustis Engineering should be retained to monitor all geotechnical related work performed by the contractor. If construction problems arise, Eustis Engineering should be notified to participate in the development of solutions. This participation permits the geotechnical engineer to evaluate the effects of unanticipated conditions and propose solutions on the geotechnical design assumptions particular to the project. The design geotechnical engineer may also be able to judge how site specific soil and ground water conditions will affect the success of a proposed construction alternative.





- (1) PILES ASSUMED TO BE INSTALLED BY VIBRATORY EQUIPMENT.
- (2) ALLOWABLE PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE DO NOT INCLUDE THE WEIGHT OF THE PILES.
- (3) ALLOWABLE PILE LOAD CAPACITIES PRESENTED ON THIS FIGURE NEGLECT THE CAPACITY TO EL -23 (MSL) FOR EMBEDMENT OF THE PILE WITHIN THE CASING AND GROUTING PROCEDURES DESCRIBED IN THE CONSTRUCTION SEQUENCE PROPOSED BY CHEVRON CHEMICAL COMPANY DATED 31 MAY 2005.



EUSTIS ENGINEERING COMPANY, INC. GEOTECHNICAL ENGINEERS

3011 28TH STREET

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ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES

8-IN. DIAMETER OPEN END STEEL PIPE PILES

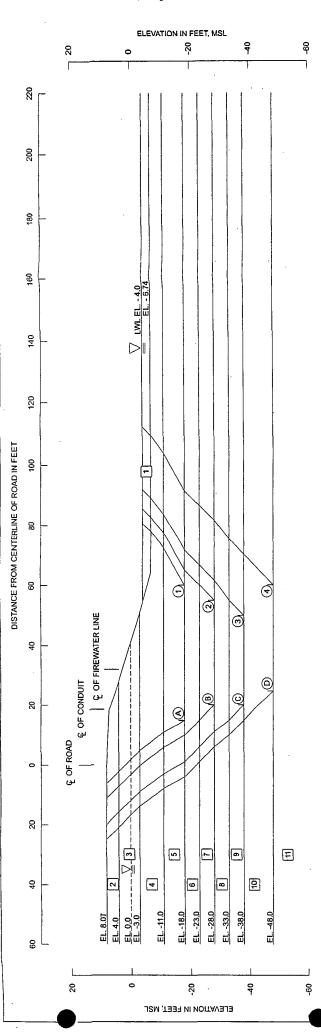
CHEVRON CHEMICAL COMPANY

OAK POINT PLANT

STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

DRAWN BY: S.R.S.	2 JUNE 2005	FILE:APLC-VIB.GRF
CHECKED BY: G.P.S.	JOB NO.: 18916	FIGURE 2



NOTES:
1. SLOPE STABILITY ANALYSES PERFORMED
BY LMVD METHOD OF PLANES.
2. FACTOR OF SAFETY COMPUTED AS RATIO OF RESISTING TO DRIVING FORCES.

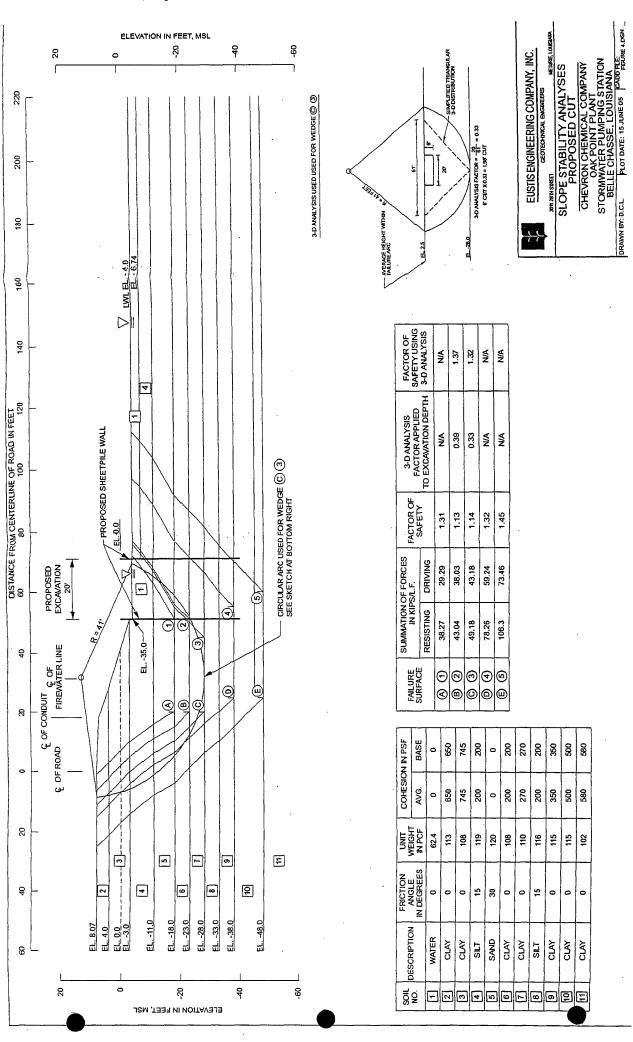
SLOPE STABILITY ANALYSES
EXISTING CONDITIONS
CHEVRON CHEMICAL COMPANY
OAK POINT PLANT
STORMWATER PLIMPING STATION
BELLE CHASSE, LOUISIANA

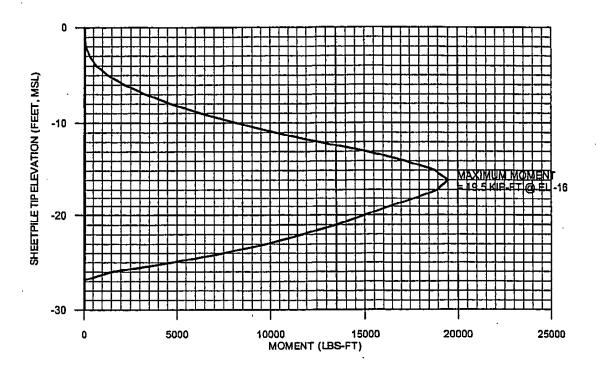
DRAWN BY: D.C.L.

EUSTIS ENGINEERING COMPANY, INC.

FACTOR OF	32F	1.7.1	1.38	1.43	1.50		
OF FORCES SAL.F.	DRIVING	27.78	41.7	25.7	70.84		
SUMMATION OF FORCES IN KIPS/L.F.	RESISTING	47.61	57.52	79.57	(D) (4) 106.3 70.84		
FAILURE		(O) (⊗)	(B) (D)	ම ම	(P)		

N IN PSF	BASE	0	650	745	200	0	200	270	200	350	200	280
COHESION IN PSF	AVG.	0	650	745	200	0	200	270	200	350	200	580
THUSH	Z PCT	62.4	113	108	119	120	108	110	116	115	115	102
FRICTION ANG! E	IN DEGREES	0	0	0	15	30	0	0	15	0	0	0
NOLIZIGUSEU		WATER	CLAY	CLAY	SILT	SAND	CLAY	CLAY	SILT	CLAY	CLAY	CLAY
SOIL	Ö.	▣	2	ဨ	4	5	9	[7]	8	6	6	Ŧ





- (1) WATER LEVELS ASSUMED TO BE AT EL -4 WITHIN EXCAVATION. BOTTOM OF EXCAVATION AT EL -11.
- (2) ASSUMES ADHESION OF THE SOIL TO THE STEEL SHEETPILES EQUAL TO 50 PERCENT OF THE UNDRAINED SHEAR STRENGTHS.



EUSTIS ENGINEERING COMPANY, INC. GEOTECHNICAL ENGINEERS

3011 28TH STREET

METAIRIE, LOUISIANA

MOMENT DIAGRAM (UNFACTORED)

EASTERN COFFERDAM WALL

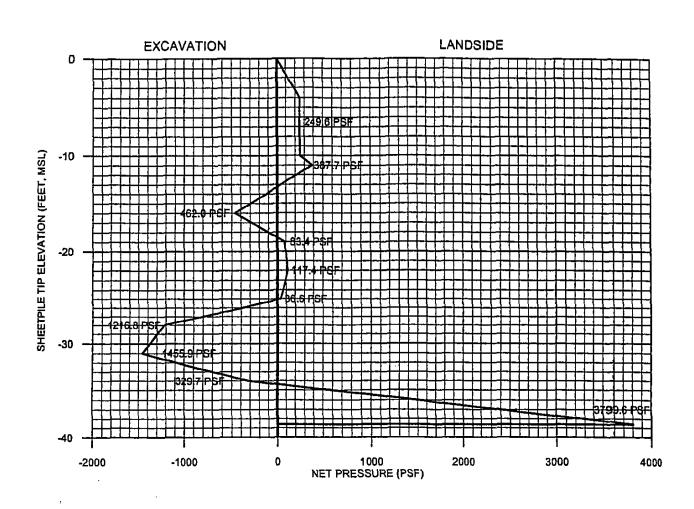
CHEVRON CHEMICAL COMPANY

OAK POINT PLANT

STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

DRAWN BY: S.R.S.	20 JUNE 2005	FILE:FIGURE 5.GRF
CHECKED BY: G.P.S.	JOB NO.: 18916	FIGURE 5



- (1) WATER LEVELS ASSUMED TO BE AT EL -4 WITHIN EXCAVATION. BOTTOM OF EXCAVATION AT EL -11.
- (2) PRESSURES REPRESENT A FACTOR OF SAFETY OF 1.3 APPLIED TO THE SOIL PARAMETERS.
- (3) ASSUMES ADHESION OF THE SOIL TO THE STEEL SHEETPILES EQUAL TO 50 PERCENT OF THE UNDRAINED SHEAR STRENGTHS.



EUSTIS ENGINEERING COMPANY, INC. GEOTECHNICAL ENGINEERS

3011 28TH STREET

METAIRIE, LOUISIAN,

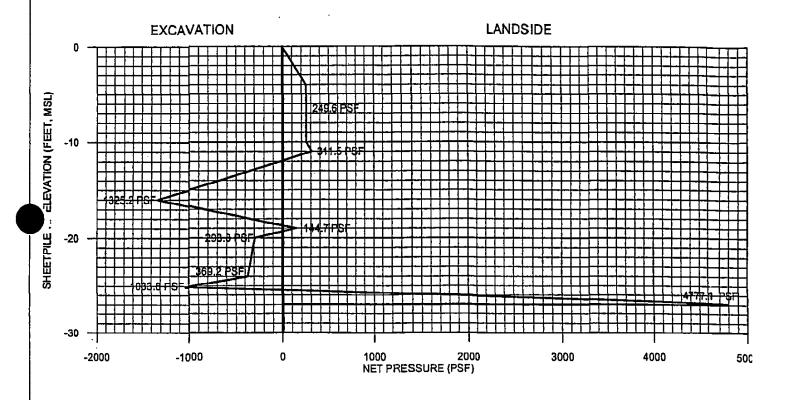
NET SOIL PRESSURES (FACTORED)

EASTERN COFFERDAM WALL

CHEVRON CHEMICAL COMPANY
OAK POINT PLANT

STORMWATER PUMPING STATION
BELLE CHASSE, LOUISIANA

DRAWN BY: S.R.S.	17 JUNE 2005	FILEFIGURE 6,GRF
CHECKED BY: G.P.S.	JOB NO.: 18916	FIGURE 6



- (1) WATER LEVELS ASSUMED TO BE AT EL -4 WITHIN EXCAVATION. BOTTOM OF EXCAVATION AT EL -11.
- (2) ASSUMES ADHESION OF THE SOIL TO THE STEEL SHEETPILES EQUAL TO 50 PERCENT OF THE UNDRAINED SHEAR STRENGTHS.



EUSTIS ENGINEERING COMPANY, INC. GEOTECHNICAL ENGINEERS

3011 28TH STREET

METAIRIE, LOUISIAN

NET SOIL PRESSURES (UNFACTORED)

EASTERN COFFERDAM WALL

CHEVRON CHEMICAL COMPANY

OAK POINT PLANT

STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

DRAWN BY: S.R.S.	17 JUNE 2005	FILEFIGURE 7.GRF
CHECKED BY: G.P.S.	JOB NO.: 18916	FIGURE 7

APPENDIX



LEGEND AND NOTES FOR LOG OF BORING AND TEST RESULTS

PP	Pocket penetrometer resistance in tons per square foot											
SPT	Star 1.4-	ndard Penetration Test: N in. I.D. sampler a distant	iumber of blows of a se of 1 foot into the	140-lb. hammer soil after first sea	dropped 30 inches relating it 6 inches	equired to drive 2-in. O.D.						
SPLR	Тур	e of Sampling	Shelby	SPT .	Auger	No sample						
SYMBOL	Clay	y Silt I Silt Silt Silt Sind Silt Silt Silt Silt Silt Silt Silt Silt	Sand Output Peat/Hu	mus Shells	Stone/Grave1							
USC	Unifi	ed Soil Classification		J	•							
DENSITY	Unit weight in pounds per cubic foot											
SHEAR TE TYPE Ø c	UC OB UU CU DS Angle	Unconfined compression Unconsolidated undrain confined at the approxication Unconsolidated undrained Consolidated undrained Direct shear of internal friction in design of the pounds per squares	ned triaxial compres mate overburden pr ned triaxial compres d triaxial compression egrees	essure sion shear	e specimen							
ATTERBER LL PL PI OTHER TE	Liqui Plasi Plasi STS CON PD k	ITS d Limit iic Limit licity Index Consolidation Particle size distributio Coefficient of permeab	•	•								
	SP	Swelling pressure in po	ounds per square fo	ot								

GENERAL NOTES

Other laboratory test results reported on separate figures

- (1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.
- (2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS
CHEVRON CHEMICAL COMPANY
OAK POINT PLANT

(Sheet 1 of 2)

STORMWATER PUMPING STATION
BELLE CHASSE, LOUISIANA
Text Joh No. 18046 Parts Deligation ũ Gr Water Datum: Met

													·			
Refer to "Legends & Notes"	Other	Tests								O.			-			
Refer to "L					·											•
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	Shear Tests	15	1	t	1	1	i	1					1	I		1
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Date Drilled: 5/23/05	Density	Wet	113	107	108	120	119	117					110	116		115
Drille	Dei	Dry	2	22	75	92	68	87					#	88		88
Date	Water	Percent	34	47	43	31	33	¥	27		-	99		33	88	31
t Job No.: 18916 Date Dr	Depth	In Feet	0-0.5 0.5-1.5 2-3	5-6	6-8	11-12	14-15	17-18	18.5-20	21.5-23	24.5-26	27.5-29	33-34	38-39	43.5-45	49-50
Job No.:	Sample	Number	1 2 3	4	, ro	ဖ		- ∞	6	우 	=	12	. 13	4	75	16
Text	osa		SM	ಕ	7	ĭ ME	M		WS.			ਲ ਨ	ರ	ML	ರ	ಠ
Datum: MSL Gr. Water Depth: See Text	Visual Classification		Compact white shells Medium dense brown silty sand w/clayey silt Vayers	Medium sliff gray slity day wifine sand layers lenses, & pockets, & roots Medium sliff gray & tan clay w/wood fragments	& concretions w/silt pockets & wood	Medium compact gray sandy silt	Medium compact gray clayey silt		Medium dense gray slity sand			Very soft gray clay w/shell fragments & silt pockets	Soft gray silty clay w/clay lenses	Loose gray clayey silt w/sandy silt layers	Very soft gray silty day w/dayey silt lenses & wood	Medium stiff gray silty clay w/silty sand lenses
Datun	S Svmbo					复										
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i Elev.:	d.		3.50	1.90	1.25											
Ground Elev.:	Scale	Feet	0	1 1	101	-T	-T-	,	2				<u> </u>	1 -1	}	50.

Comments:

EUSTIS ENGINEERING COMPANY, INC.

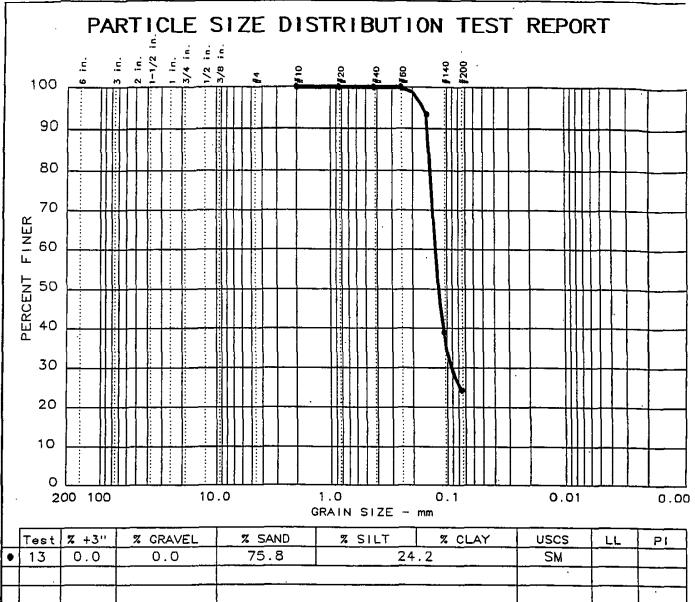
LOG OF BORING AND TEST RESULTS CHEVRON CHEMICAL COMPANY OAK POINT PLANT STORMWATER PUMPING STATION

BELLE CHASSE, LOUISIANA

(Sheet 2 of 2)

Refer to "Legends & Notes" Other Tests ਛ Atterberg Limits 굽 Boring: Ⅎ ğ 525 Shear Tests Type ទ 2 Date Drilled: 5/23/05 103 Xe 101 Density 5 69 65 Water Content Percent 99 49 37 See Text Job No.: 18916 Depth In Feet 69-70 74-75 53-54 58-59 63-64 Sample Number 17 5 19 20 2 OSC 동 ರ 占 Soft gray silty clay wisilty sand lenses & clayey silt tenses Medium stiff gray silty day wisilty sand lenses Gr. Water Depth: Medium stiff gray clay w/silt pockets Visual Classification Medium stiff gray clay Datum: MSL S P Symbol R SPT Sround Elev.: 8.0 0.25 0.50 0.25 0.25 0.25 ď 5 Scale In Feet 9 9 è

Comments:



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100	93.3		
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Remarks: Sample Depth 23.0'

Eustis Engineering Company, Inc. Project No.: 18916

Project: Chevron Chemical Co. - Oak Point Plant

Date: 5-30-05

Data Sheet No.

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-11

`	Description		ept (ft	Thickness (ft)	
	Fill material - shell	0	· ·	1.5	1.5
	Clay, silty, soft to very soft, gray with black stains; shell fragments	1.5		6	4.5
P	Clay, silty, soft, gray; organics	6 ;·	-	9	3
Ļ	Clay, sandy, soft, gray	. 9	_	10.5	1.5
اسا	Sand, silty, very loose, gray	10.5	-	12	1.5
	Clay, silty, soft to very soft, gray; sand lenses	12	_	16.5	4.5
	Clay, silty, very soft, gray; shell fragments	16.5	_	18	1.5
	Clay, silty, very soft, gray; sand lenses; shell fragments	18	_	23.5	5.5
Ü	ilt, sandy, soft, gray	23.5	-	24	.5
	Sand, silty, loose to firm, gray	24	-	28.5	4.5
	Sand, clayey, loose, gray	28.5	-	30	1.5

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-12

Description		ept (ft	Thickness (ft)	
Fill material - shell and rocks	0	_	3	3
Clay, silty, soft to very soft, gray	3 ·	-	9	6
Clay, silty, very soft, gray	9	-	13.5	4.5
Clay, sandy, soft to very soft, gray	13.5	-	16.5	3
Clay, silty, very soft, gray; shell fragments; trace of sand	16.5	-	22.5	6
Clay, sandy, soft, gray	22.5	-	24	1.5
Sand, silty, loose, gray	24	-	27	3
Sand, clayey, loose to very loose, gray; organics	27	-	28.5	1.5
Clay, sandy, soft, gray; organics	28.5	-	30	1.5

Geraghty & Miller, Inc.

LITHOLOGIC LOG OF MONITOR WELL MW-19

Description	Depth (ft)			Thickness (ft)
No split spoon sample taken due to possible underground pipes - material was fill - shells and clay	Ö	-	3	3
Clay, silty, soft to firm, gray; organics.	3	-	6	3
Clay, silty, soft, brown and gray; sand stringers	;· 6	-	9	3
Clay, silty, very soft, gray with black streaks	9	-	10.5	1.5
Clay, silty, soft, gray	10.5	-	12.5	2
Clay, silty, soft to very soft, gray; sand lenses	12.5	-	18.5	6
Clay, silty, very soft, gray; shell fragments	18.5	_	26	7.5
Clay, silty, very soft, gray; sand lenses.	26	-	27.5	1.5
Silt, sandy, soft, gray	27.5	-	29	1.5
Sand, silty, loose, gray	29	-	32	3
Sand, silty, loose, gray with black streaks	32	-	33.5	1.5
Sand, silty, loose, gray with black streaks; trace of clay	33.5	-	35	1.5

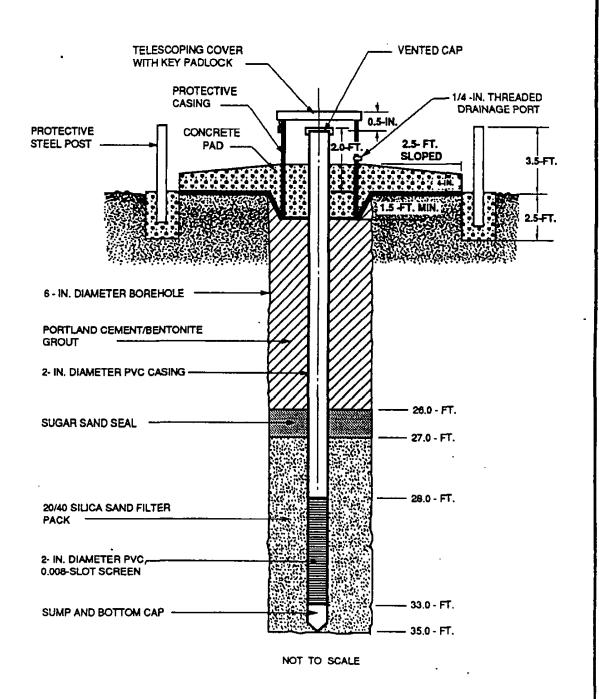
GERAGHTY & MILLER, INC.

TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-19

PROJECT
CHEVRON CHEMICAL CO.
Beile Chase, Louisiana



NOTE: All Depth Measurements in Feet Below Ground Surface

LA171.02-MW-19

9

ARCADIS GERAGHTY & MILLER

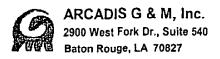
WELL CONSTRUCTION LOG (UNCONSOLIDATED)

		Land Surface	Project Chevron Chemical Co./LA001974.0001 Well LM:	I MS-1R
			ity Belle Chasse	
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Plaquemines Parish State	Louisiana
		drilled hole	Land-Surface Elevation	
			4 feet	Surveyed
		asin	NGVD	Estimated
		2 inch diameter,	The state of the s	
			- 1 -	
		7 Backfill	<u></u>	
		Grout cement		
		4% Bentonite gel/Portland Cement		
		2.0 84	Development Technique(s) and Date(s)	
			hand bail (6-23-00)	
		- Bentonite		
		3.0 ft* pellets		
		1/4"		=
				gallons :
	T		ng Development 15	gallons
Щ	П		3	ow M.P.
<u>11</u>	ii II	Well Screen,	Pumping Depth to Water NA feet below M.P.	ow M.P.
Ш	··· M	.= 	Pumping Duration NA hours	
11	II	PVC, 0.010 slot	Yield NA gpm Date	
Ш	П		Specific Capacity NA gpm/ft	
11	П		Well Purpose replacement of monitoring well for damaged Well MS	Vell MS
ш	Ш	Gravel Pack		
Ш	: ;	Sand Pack		
<u> </u>	Π	Formation Collarse	Remarks flush mount well: orout shury measured 13 9 lbs/gallon before	والم
ш	Π		•	
Ш	П		and after placement.	
ш	П			
mi		15.0 ft*		
		15.0 A*		
,	i.	Managina Brita is Ton of Well Coine Holose Otherwise Mead	ricparca oy N. Mongomay	ļ
Į.	h Below	 Presenting Four is 10p to we cannot concess that when I better Below Land Surface 		
		•		

ARCADIS Geraghty & Miller, Inc.

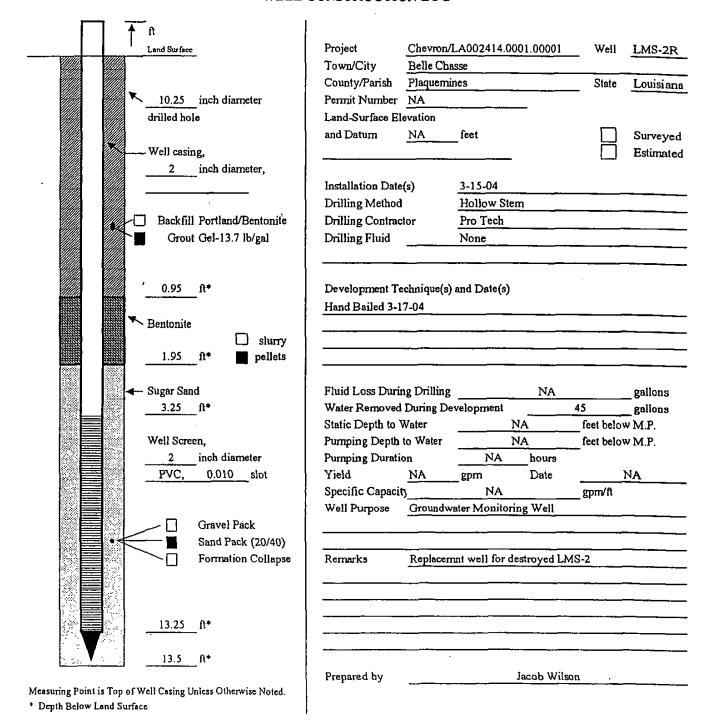
SAMPLE/CORE LOG

Location Belle Chasse, Louisiana Started 06/23/00 0725 Co Land-Surface Elev. 4 feet □ Surveyed ☑ Estimated Datum N Drilling Fluid None Drilling Drilling	Helper Hamm Drop	llow Sten	
Drilling Fluid None Drilling Method Us Drilling Contractor Fugro Driller David Prepared By K. Montgomery Weight N/A	ed <u>Hol</u> Helper <u></u> Hamm Drop	N/A_	·
Drilling Contractor Fugro Driller David Prepared By K. Montgomery Weight	Helper Hamm Drop	N/A_	·
Contractor Fugro Driller David Prepared Hammer By K. Montgomery Weight N/A	Hamm Drop	107	·
By K. Montgomery Welght N/A	Drop	10f N/	
	•		A inches
Silty Clay Silty Silty Silty Silty Silty Sandy Silt Silty Sand Shelby Tube			
	V W	/ater First	Encountered
Clay Sandy Clay Clayey Silt Sand Clayey Sand Split Spoon	₩ W	/ater Leve	i After 10 Min
u E - z	1	1	1
USCS (LIVPUPI)	PP (H/V)	OVA	REMARKS
4 - 3 - 1 - 3	,,,,	(ppm)	
o -			
Not sampled, 0-10 ft bis		Ì	•
	İ	İ	İ
			1
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<u>-</u>	ļ		İ
		İ	
-			
-			İ
Clayey silt (30 %), gray, sand partings, weet			
2.0			
· - =			
- (20 %), gray, less clay, sandy (10 %), gray			
Total Depth - 15 ft bis			
			[
_			1
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]
			}
-	1		
-			
-			İ



	oring	g/We	ell:	LMS-	2R		Project No.: C	hevron Oak Poir	t/LA	02414.0001.	00001			Р	age 1 of 1		
S	Site Location: Belle Chasse, LA; West Ditch and Hwy 23 Drilling Started: 3/15/04 0800 Drilling Completed: 3/15/04 0910											5/04 0910					
L	Land-Surface Elev.: NA Surveyed: NA Estimated: NA Datum: NA																
D	Drilling Fluid:None Drilling Method Used; Hollow Stem																
Di																	
	Hammer												Hami	mer			
10	repai 🏹 Fil		Ву <u>:</u> _	J. W	Silty Cl			Sandy Silt		ight: NA Silty Sand		2 atcte	Drop leeve	(inches):			
	⊠''' Øc⊪			ZZ	Sandy (Clayey Silt	Sand		Clayey Sand				*******	irst Encountered evel After 10 Minutes		
	<u> </u>	Ī	ıı	<i> ???</i> ≿	<u>-</u>	, 		(A) Cana		Clayey Gand				T			
	SAMPLE	€	TYPE	RECOVERY (ft)	SYMBOL			VISUAL DESCRIPTION			USCS (LL/PL/PI)		PP V	OVA (wo/F) (w/F) (ppm) (ppm	REMARKS		
L	_			<u>, u.</u>	 						1	!			<u> </u>		
	0 1 2	1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2.0		CLA'	Y: fill, road bed of she	ils and gravel				0.75	0.75	NA			
	3 4					SILT red fo	Y CLAY: gray, dark g errous staining, soft, o	ray, plant root material damp	, some :	natural organics,		0.50	0.50				
	5 6	بيبايينيان		4.0		- gra	y, increase in silt cont	ent, very soft, wet				0.50	0.50	NA .	Z		
	8	thurs				- incr damp	rease in plant root ma	terial and black natural	organid	cs, soft, very		0.25	0.25				
	9 10 11	in dun		4.0		- larg	er woody root fragme	nts, stiffer, damp				0.50	075				
	12	1				SILT	Y SAND: gray, soft, w	et				0.50	0.50	NA .			
	13	and an		3.5		SILT	Y CLAY: gray, very so	oft, wet	•			0.25	0.50	NA NA			
ı	14	1				TOTA	AL DEPTH - 13,5 ft bi	s @ 0910									
1	15 16	لمسأ															
1	17	سمأ															
	18	anda															
	19	1															
	20	1															
i	21	1															
1	22	باسب															
-	23	بأييية															
	24	1													;		







Boring	/Well_	فليا	8-3	Project/No	CHEVRON	(LA554.01)			Page	11	of1
Site	20	1	Belle Cha	ess, Louisiana	· 	OrillingStarted	05-26-02	10:50 Orillin	g sketad	05-26-6	12 11:30
		Elev.		feet	[] Surveyed						
Drilling	Fluid !						Orizi	ng Method	Holl	ow Sten	<u></u>
Drilling Contra	ictor_		E	uette Engineering		Driller	Phero	h He	lper	Rev/E	rtc
Prepar By	be		1	rey Harrel			Ham Weig		Hamme Drop _		inches
-	FN (777 s	in Clay	Sint	Sandy St	nt Siny Sand		Shelby Tube			Encountered
لت				Chayey Silt	تتني	Clayey Sand		Split Spoon			After 10 Min.
				111 04,5,5				эрік эрсен	· · · · ·		AIBT IO MIL
SAMPLE DEPTH (Feel)	SAMPLE	RECOVERY (Feet)	SYMBOL		VISUA DESCRIF	-		USCS (LL/PL/PI)	PP (HV)	OVM (ppm)	REMARKS
٥			-000		Il so also alles and	4					-
1 -	Not Sampled		****	. Fill, shells, sma	ll rocks, slity san	id, brown.			j		
2 -		0.0	****								
з -		}	****				!)	}	
4 ~		1.0	7777	Clay gray stiff	some roots and	eholie dry			1	0.6	
s —				545, gray, sun		andia, wy.	i		}	}	-
6 -		2.0		- abundant i	roots and wood fi	ragments, clay turns to	, ,		}	1.2	,
7 -				greey/gray.							
8				- sitting down	nward, damp.		į	1		1.2	•
10		2.0		Silty clay, mois	L -	•					▽ -
11 -				Slit, gray, wet.	· · · · · · · · · · · · · · · · · · ·						
12 -	*	3.0		City day may	soft and sticky,	uent .			{	0.6	
13 -				· ·	, soil and secry,						•
-			-	Total Depth - 1	3.5 ft bla						•
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(UNCONSOLIDATED)

	Project Chevron Chemical LA554.01 Well LMS-3
O ft	Town/City Belle Chasse
LAND SURFACE	County Plaquemine State LA
ИИ	Permit No. NA
10½ inch diameter	Land-Surface Elevation
drilled hole	and DatumNA feet
Well casing,	
2 inch diameter, Schedule 40 PVC	Installation Date(s) 05-26-92
V /	Hollow Stom
Backfill Portland/Bentonit Grout Gel - 13.8 lb/gal	
3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Drilling Fluid None
	J
0.83 ft*	Development Technique(s) and Date(s)
Bentonite 🗆 slurry	Hand bailed 06-03-92
1.83 ft* ■ pellets	
2.33 sugar sand	
7.25	Fluid Loss During Drilling gallc
3.25 ft*	Water Removed During Development 10 gallo
Well Screen.	Static Depth to Water NAfeet below M
2 inch diameter PVC , 0.010 slot	Pumping Depth to Water NA feet below M
,	Pumping DurationNA hours
Gravel Pack	Yield NA gpm Date NA
Sand Pack (20/40)	Specific Capacity NA gpm/ft
Formation Collapse	Well Purpose Ground-water monitoring well
13.25 ft*	<u> </u>
13.5 ft*	Remarks
-	<u> </u>
Measuring Point is	
Top of Well Casing Unless Otherwise Noted.	
*Depth Below Land Surface	T Hannel
,	Prepared byT. Harrel

JEF GERAGHTY
GERAGHTY & MILLER, INC. Emironment Services
Emironmenal Services

Boring/Wi	ef _	LM	8-4	Project/No. CHEVRON (LASS4.01)			Page	_1	of 1
Site Location			lelle Che	Drilli Star		Drill)n			2 9:00
Land-Surf	ace E	lev.		feet	ned Dat	um			
Drilling Flo	uld U	sed _		None	Drii	ling Method	Holk	w Stem	<u> </u>
Drilling Contracto			. E	istis Engineering (riller Phan	oh Ho	loer	Rev/E	ric
Prepared					Hau	nmer	Hamme	<u>-</u>	
Ву				ey Harrel	We	ight <u>NA</u>	. Drop _	<u>NA</u>	Inches
FIII	7	∭ sı	ly Clay	Silt Sandy Silt Silty Si	and 🔳	Shelby Tube	▽ Wa	ter Finst	Encountered
777 cie		يخ		Clayey Silt Sand Clayey	Sand 197	Split Spoon	₩ Wei	hori avai	After 10 Min.
	" Z	<u> </u>							
SAMPLE DEPTH (Feet)	TYPE	RECOVERY (Feet)	SYMBOL	VISUAL DESCRIPTION		USCS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMARKS
° —			////	Clay, brown, very stiff, some roots and ferrous n	odules, dry.			1.8	-
2 -		2.5		- siit lenses.					,
3 -	·	1.5		Silty day, brown, soft and pliable, ferrous nodule damp.	es and roots,		 	2.5	Retained for for enalysis
5 —	41.							1.2	
7 -		2.5		Clay, gray/brown, stiff and sticky, some roots an nodules, wood fragments.	d ferrous			, -	•
8 -				•				1.8	•
• -		2.5	77//	Silty day, moist.				İ	▽ .
10	П			Silt, gray, wet.				ł	-
11 -					•] -		1.2	•
12 -		3.5		Clay, gray, stiff, sticky, dry.	 -]	0.8	•
13 -	Ц			·- <u></u>		<u> </u>		•	•
-	1			Total Depth - 13.5 ft bis			[}	•
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(UNCONSOLIDATED)

	Project Chevron Chemical LA55	4.01 Well LMS-4
2 Ft	Town/City Belle Chasse	
LAND SURFACE	County Plaquemine	State LA
ИИ	Permit No. NA	
10½ inch diameter	Land-Surface Elevation	
drilled hole	and Datum NA feet	□ Supered
K Wall and a	and Datum teet	☐ Surveyed
Well casing, 2 inch diameter.	05 22 92	□ Estimated
2 inch diameter, Schedule 40 PVC	Installation Date(s) 05-22-92 Hollow St	
Backfill Portland/Bentonit Gel - 13.8 lb/gal	e Drilling Method Hollow St	
Grout		gineering
K K K	Drilling FluidNone	
0.83 ft*		
	Development Technique(s) and Date(s	•
Bentonite ☐ slurry 1.83 ft* ■ peliets	Hand bailed 06-02-92	·
2.33 sugar sand		·
_3.25 _{ft} •	Fluid Loss During Drilling	
	Water Removed During Development_	_
Well Screen.	Static Depth to Water NA	
2 inch diameter PVC 0.010 slot	Pumping Depth to WaterNA	
	Pumping Duration NA h	
☐ ☐ Gravel Pack	Yield NA gpm	Date NA
Sand Pack (20/40)	Specific CapacityNA	- ·
Formation Collapse	Well Purpose <u>Ground-water mo</u>	nitoring well
13.25 ft*		·
	Remarks	· · · · · · · · · · · · · · · · · · ·
		<u> </u>
-		
Measuring Point is		
Top of Well Casing Unless Otherwise Noted.		
Offices Otherwise Motea.		
*Depth Below Land Surface		
•	Prepared by 1. Harrel	

GERAGHTY & MILLER, INC.
& MILLER, INC.
Environmental Services

O-d-	g/Well	ш	US-5R	Project/No. Chevron Che	mical Company (LA1:	344.0011			4	
Site	A ALGO				Drilling		Drillio	Page	<u> </u>	of
	tion _		Chasse, Lo	ulslana	Stanted	05/07/96 0		pleted	05/07/5	0930
Land	-Surfac	æ Elev.	NA	feet 🔲 Surveyed	Estimated	Data	m	A		
		d Used	NA		<u> </u>	Drilli	ng Method <u>Hol</u>	low Stem	Auger	
Orillia Cont	eactor		_ Fugre	5	Driller	Robert	Legete H	lper	Maci	cie
Prep			R. John			Ham	mer	Hamme	٠	
Ву _			n. John	Elite		Wel	tht NA	_ Drop _	N/	Inches
\sim	FILL		Silty Clay	Sit 3 Sandy S	Silty Sand		Shelby Tube	▽ Wa	ter First	Encountered
77	! ! ~		6 Ol	11111	المناسا		-	•		
	Clay		Sally Clay	Clayey Slit Sand	Clayey Sand	\square	Spilt Spoon	₩ ₩8	tel Feve	l After 10 Min.
4 - ~	Щ	ž								
SAMPLE DEPTH (Feel)	SAMPLE	8	(Feat)	VISU DESCRI			USCS (LL/PL/PI)	P P (H/V)	OVM	REMARKS
ಕ್ಷ ಕ ಕ	5 T	RECOVERY	- k	J. DESCRI			(Wrom,	"""	(ppm)	
0-									·	
	İ .		~~~	Fill, shells and rocks						_
1 -	1		****	·	•				•	-
2 -		╣	7777	Clay, dark gray, molst, minor a	mounts of slit firms to	offete		-		-
3		1.	5	Olay, dan gray, most, maior a	anound or one, in the, to			2.0/1.75		-
4 -				Silty day, dark gray, very mois	t soft minor iron oxide			1		•
5		1.	s ////	staining				0.050		
				- intervals of very silty clay				0.25/0		_
6 -	2			- dark gray to gray, soft, hea						
7 -		2.		- silt layer (4° thick) at 7 feet	, wer, raint nonzontal de	lading		0.5/0.5		▽-
8 -		7								
9		2.	• ////	- becoming less silty, heavy	iron exide staining/nodu	iles		0.5/0.5		_
10				Clay, dark gray, very moist to v	vet minor amount of sill	L large		!		-
11 -		1.	. ////	roots/rootlets, occasional layer				0.5/0.25		
		"		·				0.50.25		
12 -				·			•	.		4
13 -	·	1.	5	·				0.75/0.5		· =
14 -	.			- rootis/rootiets						_
15-		7	1222	Total Depth - 14.5 ft bis						
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-	1									-
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GERAGHTY & MILLER, INC.

Environmental Services

A beidemij company

WELL CONSTRUCTION LOG

Measuring Point is Top of Well Cesing Unders Otherwise Noted.

Depth Below Land Surface



State Selec Cheeses, Louistens (New Landfill) Starred O6-22-42 11:00 Completed O5-22-92 11:50	BOULU	g/Well .		18-0	Project/No	CHEVRON	(LA554.01)			_ Page	1	of
Drilling Ruld Used None Drilling Method Hollow States Contractor Eustis Engineering Driller Pharoh Helper Rev/Erfe Fig. Clay Harrel Hammer Hammer MA Drop NA Inches Fill State Sandy Clay State Sandy Site Sandy Site States Sandy Site States Sandy Site States Sandy Site States Sandy Site States Sandy Site States Sandy Clay Water First Encountered Vergin Na South First Encountered Vergin Na Inches Fill States Sandy Clay State Sandy Site Sandy Site Sandy Site Sandy Sandy Clay Water First Encountered Vergin Na Inches Vergin Na South First Encountered Vergin Na Inches Vergin Na South First Encountered Vergin Na Inches Vergin Na Inches	Site			Belle Cha	esa, Louisiana (N	low Landfill)		06-22-92	11:00 Dri	lina		. –
Drilling Contractor File Trey Name T	Land-	Surface	Elev.		feet	□ Surveyed	☐ Estimated	Date	m			
Contractor Eustis Engineering Driller Pharon Heiper Rev/Erlc Prepared Trey Narrel Hammer Na A Hammer Na Inches Prepared Stay Clay Stay Clay Stay Sand Stay Sand Sheby Tube Water First Encountered Clay Sandy Clay Clayer Stat Sand Sand Clayer Sand Split Spoon Water Level After 10 Mn. VISUAL DESCRIPTION USCS (LLPUP) Proving REMARKS Clay brown, stiff and hard, some wood and shelf fragments, femous nodules, dry. Clay, brown, stiff, dry. Clay, brown, stiff, dry. Stit, gray, wet. Clay, gray, stiff and sticky, dry.	Drillin	g Fluid	Used _		None	····		Drivi	ng Method _	Hot	low Sten	n
Fill Stly Clay Stly Clay Stl Sandy Stit Sandy Stit Shy Sand Sheby Tube Water First Encountered Water First Encountered Water First Encountered Water Level After 10 Min. VISUAL DESCRIPTION USCS (LL/PUP) PV Water Level After 10 Min. Overburden (fill). Clay brown, stiff and hard, some wood and shelf fragments, ferrous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shelf fragments, ferrous staining. Clay brown, stiff, dry. Clay, brown, stiff, dry. Clay, prown, stiff, dry. Clay, gray, wet. Clay, gray, wet. Overburden (fill).	Contr	actor _		E	ustis Engineering		Driller		·			irlo
Clay Sandy Clay Clayery Sit Clayery Sand Clayery Sand Spit Spoon Water Level After 10 Min. VISUAL DESCRIPTION USGS (ILI/PUPI) PP (PW) (ppm) REMARKS Coverburden (fill). Coverburden (fill). Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 2.5 Sit, gray, wet. Clay, gray, stiff and sticky, dry. Clay, gray, stiff and sticky, dry.		red	·-··		Trey Harrel					Hamme Drop	NA NA	inches
Clay Sandy Clay Clayery Sit Clayery Sand Clayery Sand Spit Spoon Water Level After 10 Min. VISUAL DESCRIPTION USGS (ILI/PUPI) PP (PW) (ppm) REMARKS Coverburden (fill). Coverburden (fill). Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, lemous nodules, dry. 2.5 Sit, gray, wet. Clay, gray, stiff and sticky, dry. Clay, gray, stiff and sticky, dry.	\boxtimes	FN	//// s	illty Clay	Sitt	Sandy Si	it Silty Sand		Shelby Tube	▽ wa	ter First	Encountered
Overburden (fill). Clay, brown, stiff and hard, some wood and shell fragments, ferrous nodules, dry. 1.5 Clay, brown, stiff and hard, some wood and shell fragments, ferrous nodules, dry. 1.5 - ferrous staining. 1.2 Clay brown, stiff, dry. 2.5 Clay, brown, stiff, dry. Stift, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry. Clay, gray, stiff and sticky, dry.	\overline{Z}	Ctary	72		with the same of t		<u> </u>		Split Spaan	▼ wa	iter Leve	I After 10 Min.
1.5 Clay, brown, stiff and hard, some wood and shell fragments, ferrous nodules, dry. 1.5 Clayey sit (3070), shemating brown/gray/orange seams, wet. 2.5 Clayey sit (3070), shemating brown/gray/orange seams, wet. 2.5 Clay, brown, stiff, dry. 2.5 Sit, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry.	SAMPLE DEPTH (FOOL)	SAMPLE	RECOVERY (Feet)	SYMBOL								REMARKS
1.5 Clay, brown, stiff and hard, some wood and shell fragments, ferrous nodules, dry. 1.5 Clayey sit (3070), shemating brown/gray/orange seams, wet. 2.5 Clayey sit (3070), shemating brown/gray/orange seams, wet. 2.5 Clay, brown, stiff, dry. 2.5 Sit, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry.	0 _			2000								
2 - Sampled 3 - 4 - 5 5 - 6 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7	, _	Nan			Overburden (f	ii).						_
S - 4 - 5 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6			4 .									•
1.5 Clay, brown, stiff and hard, some wood and shell fragments, ferrous nodules, dry. 1.5 clayey sit (30/70), alternating brown/gray/orange seams, wet. 2.5 Clay, brown, stiff, dry. Clay, brown, stiff, dry. Sit, gray, wet. Clay, gray, stiff and sticky, dry.	2 -											•
Clay, brown, stiff and hard, some wood and shell fragments, lerrous nodules, dry. 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	3 -			****						1		•
Clay, brown, stiff and hard, some wood and shell fragments, lerrous nodules, dry. 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	4 -			****								
Clay, brown, stiff and hard, some wood and shell fragments, lerrous nodules, dry. 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	5 —	20	1	****								
## 1.5 ferrous nodules, dry. 1.5 ferrous staining. 1.2 1.5 1.5 Clayey sit (30/70), alternating brown/gray/orange seams, wet. 1.2 1.3 1.4 1.5 1.5 1.6 1.7 1.7 Clay, gray, stiff and sticky, dry. 1.8 1.9 1.10 1.11 1.12 1.12 1.2 1.3 1.4 1.5 1.5 1.6 1.7 1.7 1.8 1.9 1.9 1.10 1.10 1.11 1.12 1.12 1.13 1.14 1.15 1.15 1.16 1.17 1.18 1.18 1.19 1.10	5 <u>-</u>			7777	Clare harries of	elf and hard an-	d and shot from			_		· · · · · · · · · · · · · · · · · · ·
8 - 9 - 1.5 - ferrous staining. 1.2 - 1.5 - ferrous staining. 1.2 - 1.5 - 1.5 - Clayey sit (30/70), alternating brown/gray/orange seams, wet. 1.2 - 1.	7 -		1.5		• .		MACCO STID BUSIC ITSUIT	rerius,			3.1	
2.5 Clayey slit (30/70), alternating brown/gray/orange seams, wet. 1.2 Clay, brown, stiff, dry. 2.5 Slit, gray, wet.	a -		Ė		-		•					•
2.5 Clayey slit (30/70), alternating brown/gray/orange seams, wet. 1.2 Clay, brown, stiff, dry. 2.5 Slit, gray, wet.			1.5		- former et	hilalaa		i			1.2	
2.5 Clay, brown, stiff, dry. 2.5 Slit, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry.	10 —				· 1011000 5	waning.						_
2.5 Clay, brown, stiff, dry. 2.5 Slit, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry.	, _			122	Clause ell (20	(70) elloweting b				-		▽ -
13 — 2.5 Clay, brown, stiff, dry. 2.5 Sit, gray, wet. - wood fragments. Clay, gray, stiff and sticky, dry.			2.5	1111	Ciayey sat (30	779), anomazilg c	towing ayou and a seci	ia, wor			1.2	•
2.5 Slit, gray, wet.				1111						4		•
Slit, gray, wet. 15 —	13 -				Ciziy, brown, s	aπ, σry.			l		0.6	•
16 - 17 - 18 - 18 - Clay, gray, stiff and sticky, dry.	14 -		2.5	Killin	Silt, gray, wet.		<u></u>			┥ .		-
- wood fragments. Clay, gray, stiff and sticky, dry.	15 —		1		- - ·							-
18 _ Clay, gray, stiff and sticky, dry.	16 –						•				0.0	
	17 -			-	- wood frag	gments.						
19 _ Total Depth - 18.5 ft bia	18 _				Clay, gray, stif	f and sticky, dry.				7		
	19 _		†		Total Depth -	18.5 ft bla	···			-		
				1 [-
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	-											•
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	-											-
		<u> </u>		<u> </u>		 -	·					



(UNCONSOLIDATED)

□ -	Project Chevron Ch		Well LMS-6
2 ft LAND SURFACE	Town/City Belle	Chasse	
	County Plaque	mine	StateLA
ИИ П	Permit No. NA		<u></u>
10½ inch diameter	Land-Surface Elevation	n	
drilled hole	and Datum NA	feet	☐ Surveyed
Well casing,			☐ Estimated
2 inch diameter, Schedule 40 PVC	Installation Date(s)	05-22-92	
Backfill Portland/Bentonit		11-11 01	
Grout Gel - 13.8 lb/gal	Drilling Contractor	Eustis Engine	ering
ИИТ	Drilling Fluid	None	
5.83 ft*			
	Development Techniqu		
Bentonite Surry 6.83 ft Bentonite	Hand bailed (06-02-92	
7.33 sugar sand			
8.25 ft•	Fluid Loss During Drillin	-	gallo
	Water Removed During		
Well Screen. 2 inch diameter	Static Depth to Water	NA NA	feet below M.
PVC			feet below M.
Well Screen. 2 inch diameter PVC , 0.010 slot Gravel Pack Sand Pack (20/40) Formation Collapse	Pumping Duration YieldNA		Date NA
Gravel Pack Sand Pack (20/40)	Specific Capacity	_	
Sand Pack (20740) Formation Collapse			ing well
	·		
18.25 ft*			
	Remarks		
<u>18.5</u> ft*			
-			
Measuring Point is			
Top of Well Casing			
Unless Otherwise Noted.			
*Depth Below Land Surface			•
I	Prepared by	T. Harrel	

GERAGHTY
& MILLER, INC.
Emironmental Services

SAMPLE/CORE LO.

Borin	g/Well		8-7_	Project/No	CHEVRON	(LA554.01)			Page	1_	of <u>1</u>
Site				(Animal Shelter)		Drilling Stanted	-05-20-82	7:35 Com	ng pleted	05-20-9	9:00
				feet	☐ Surveyed		Date	ım	_		
	_	Used _		None	·			ng Method			
Drillin Contr			E	ustis Engineering		Driller	Pharo	<u>ћ</u> н	elper	Rev/E	rie
Prepa		_		pper Montgomery			Harr Wei		Hamme		in the co
By _	·			шш	CT.TI	(राजा	~		_ Drop _		
\simeq	All	s s	lity Clary	Sin Sin	Sandy Si	Slity Sand		Shelby Tube	♥ Wa	iter First	Encountered
	Clay	/// s	andy Clay	Clayey Silt	Sand	Clayey Sand	\square	Split Spoon	▼ Wa	ter Level	After 10 Min.
SAMPLE DEPTH (Feat)	SAMPLE	RECOVERY (Foot)	SYMBOL		VISUA DESCRIP	_		USCS (LL/PUPI)	PP (HVV)	OVM (ppm)	REMARKS
		+=-	 						-		
° —			****	Grass, shells, i	ŢW.		-	<u></u>	1		-
1 -		0.0		Silty day, very brown.	hard, some rocks	(smali), dry, dark			1	0.0	,
2 -		1.5		- silty (40%)), ferrous concreti						
3 -				- sandy, (tra	ous concretions, (sce) silt (30%), gr	ay to brown.			}	0.0	
4 -	*	2.5				rown, soft, friable. ating), gray and brown	ı. wet	 	,		, I
5	21/4 21/4	2.3									▽ -
7 -		7		Clay, natural o		ist, soft, ferrous stalin			1	0.0	•
, -		2.5						ĺ			•
	1. /. 1.			Silty clay (40%) discoloration.), wet clay, tan to	gray, ferrous] ,		•
10 —	-	2.5		- gray, soft,	gray sandy slit po	ockets throughout.]		_
11 -				Sandy silt (30%), dayey (Tace),	wet, gray.	•				
12 -				- rootlets.			İ				
13 -						•					-
_		1.5	1:1:1:1:	Total Depth - 1	3.5 ft bis				1		
-								•			_
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(UNCONSOLIDATED)

		Project Chevron Chemical LA554.01 Well LMS-7
	O ft	Town/City Belle Chasse
	LAND SURFACE	County Plaquemine State LA
 	1 M	Permit No. NA
	10½ inch diameter	Land-Surface Elevation
	drilled hole	and Datum NA feet Surveyed
/	Well casing,	D Estimated
	2 inch diameter, Schedule 40 PVC	Installation Date(s) 05-20-92
	Backfill Portland/Bentonite	Drilling Method Hollow Stem
	Grout Gel = 13.8 lb/gal	Drilling Contractor <u>Eustis Engineering</u>
\ \{\	11/	Drilling FluidNone
Ľ	0.83 ft*	
		Development Technique(s) and Date(s)
1	Bentonite ☐ slurry 1.83 ft* p pellets	<u> Hand bailed - 06-03-92</u>
		· · · · · · · · · · · · · · · · · · ·
	2.33 sugar sand	
		Fluid Loss During Drilling NA gallo
		Water Removed During Development6 gallo
	Well Screen. 2 inch diameter	Static Depth to Water NA feet below M. Pumping Depth to Water NA feet below M.
	PVC , 0.010 slot	Pumping Depth to Water
		Yield NA gpm Date NA
	Gravel Pack Sand Pack (20/40)	Specific Capacity NA gpm/ft
	Gravel Pack Sand Pack (20/40) Formation Collapse	Well Purpose Ground-water monitoring well
	13.25 ft*	
	13.5 6.	Remarks
نفيية		
	•	
	Measuring Point is	
)	Top of Well Casing Unless Otherwise Noted.	
<u>:</u>	·	
	*Depth Below Land Surface	Prepared by Kipper Montgomery
	· ·	Prepared byKipper montgomery

G&M Form 05-12-BB Southpark the 0978

GERAGHTY & MILLER, INC.
Emironautel Services

Bortn	g/Well	1	M8-0	Project/No	CHEVRON	(LA554.01)		_	Page	1	of1
Site	ion			Treatment Plant		Orilling Started	05-21-92	11:15 Drill	ina "	-	2 12:10
Land	Surfac	e Elev.		feet	☐ Surveyed	□ Estimated		vm			
Drillin	g Fluid	Used	 	None			Drill	ing Method	Hol	low Sten	<u> </u>
Drillin	o o			ustis Engineering		Oriller	Phan	<u> </u>	elper	Rev/E	irlo
Prepa By _	red		К	ipper Montgomery				nmer ght <u>NA</u>	mmeH _ qord		Inches
\approx	FIII		Silty Clay	Sit Sit	Sandy Sil	t Silty Sand		Shelby Tube	⊅ `w	ater First	Encountered
	Clay		Sandy Clay	Clayey Sit	Sand	Clayey Sand		Split Spoon	▼ Wa	ater Løve	After 10 Min.
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY	SYLEBOL	·	VISU/ DESCRIP	_		USCS (LL/PUPI)	PP (H/ √)	OVM (ppm)	REMARKS
° –			****	Grass, slit, she	Nis (fill).				-	,	•
2 -		2.5			to hard, dark brown, soft, rootlets.	wn, shells, dry.	•		1		
3 -		2.5		Silty sand, very	/ fine (30%), brow	m, moist					
5 —		2.5		Silty clay, (20%	6), stiff, brown.					0.0	▽ .
7 -	···			- high in na gray, wet.	tural organics (fer	rrous staining), fracture	d,				
6 -		2.5		- brown, co	ntinued wet to mo	olst, (30%) silt.				0.0	
10 —		2.5			ments and roots, I a continue, wet.	brown.					-
11 -				9 .07, 1000		•		-		<u> </u>	
13 -		3.5									
				Total Depth - 1	13.5 ft bls						_
-											
-											
-											
-											•
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-											
_											
L								1		لــــــــــــــــــــــــــــــــــــــ	



(UNCONSOLIDATED)

	2 ft LAND SURFACE	Project Chevron Chemical LA554.0 Town/City Belle Chasse	1 Well LMS-8
		County Plaquemine	StateLA
	101	Permit No. NA	-
	10½ inch diameter	Land-Surface Elevation	
		and Datum <u>NA</u> feet	☐ Surveyed
	Well casing,		☐ Estimated
K	2 inch diameter, Schedule 40 PVC	Installation Date(s)05-21-92	
	Backfill Portland/Bentonit	Drilling Method Hollow Stem	
	Grout Gel - 13.8 lb/gal	Drilling ContractorEustis Engine	ering
	10	Drilling Fluid - None	
	0.83_ft•		
		Development Technique(s) and Date(s)	·
	Bentonite ☐ sturry 1.83_ft* ■ pellets	Hand bailed 06-03-92	-
			<u> </u>
	2.33 sugar sand		
		Fluid Loss During Drilling NA	<u> </u>
		Water Removed During Development	_
	Well Screen2 inch_diameter	Static Depth to WaterNA	
	PVC , 0.010 slot	Pumping Depth to Water NA	feet below M.F
		Pumping Duration NA hours	D. I. NO
	Gravel Pack	Yield <u>NA</u> gpm Specific Capacity <u>NA</u> gpr	Date <u>NA</u>
	Sand Pack (20/40) Formation Collapse	Well Purpose Ground-water monit	
	Gravel Pack Sand Pack (20/40) Formation Collapse	Well Ful pose 42 od 14 Water monte	OTTING WOTT
	13.25 _{ft*}		
		Remarks	
<u> </u>		· ·	· · · · · · · · · · · · · · · · · · ·
	_		
	Measuring Point is		
	Top of Well Casing		
	Unless Otherwise Noted.		
	*Depth Below Land Surface		
	i	Prepared by Kipper Montgome	ry

G&M Form 05 12-88

Soumpini 89 0978

JE GERAGHTY
A MILLER, INC.
Environmental Services

SAMPLE/COR_ ±OG

Borte	ng/Wel	·		.	Project/No. CHEVRON (LASS4.01)	·	Page	1	of1
Site Loca	tion _	175	W of	NW Corr	ner of Landfill C (Hero Parish Property) Drilling Started 05-28-9:	2_12:30 C	rilling ompieted	05-28-	92 13:45
Land	-Surfa	∞ Ei	ev		feet Surveyed Estimated Da	atum			
	-	d Use	ad		None Dr	Wing Method	Holl	ow Sten	1
Orille Cont	NG TBCTOT				ustis Engineering Orition Pha	roh	Helper	Rev/I	Erlo
Prep. By .	ered 			K		ummer eightN/	Hamme Drop _		inches
₽		87	- 7 cr	ty Clay	Silty Sandy Silt Silty Sand	Shelby Tub			
	 		4						Encountered
	City	Z	1 ³⁴	I Oy Clay	Clayey Satt Sand Clayey Sand	Split Spoon	✓ Wa	IBF LEVE	After 10 Min.
SAMPLE DEPTH (Feel)	SAMPLE		(Feet)	SYMBOL	VISUAL DESCRIPTION	USCS (LL/PL/P	PP (H/V)	OVM (ppm)	REMARKS
0, -	-	18	<u> </u>	<i>w</i>		+			
۰		7		~~~	Fill, clay.		-		<u>-</u>
١ -				$\widetilde{}$					
2 -			2.0	~~~ ~~~		 	_	0.0	•
3 -					Silty clay, gray to brown, hard, shells, rooties.			0.0	
4 -		6.	2.0		- silty (20%), dry, hard, some shells. - hard, dark brown, terrous natural organics throughout.		4+		•
5 		7	2.0					0.0	Sample
7 -	35				- silty (25%), light brown.				susiyses
8	2680	•	2.5		- silty (40%), moist, loose.				· ▼
s -			į		- sitt seam, very moist.				-
10 —			2.5		- slit (30%), moist, gray.		1.0/1.0		_
11 -					- high in natural organics, brown to gray, wet.	-	1		-
12 -		1.			- gray, less brown, soft.				-
13 -		•	2.0		- very soft, wet.		r0.25v-r0.25		-
14 -					-abundant wood.	į	1 1	1	
15		7	2.0		- sity (40%), gray, wet, "sticky", wood continued.	ļ			
16 _					Sandy silt (40%), very fine, gray, wet.				-
17 _		-{ :	2.5	1444	Total Depth - 17.5 ft bis	<u> </u>	_	}	_
_			l				1 1	- [_
_						1			_
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(UNCONSOLIDATED)

- 1	Project _ Chevion Chemical - LA554.0	11 Well LMS-9
ft 2.5	Town/City Belle Chasse	
LAND SURFACE	County Plaquemine	State LA
ИИ .	Permit No. NA	
10½ inch diameter	Land-Surface Elevation	-
drilled hole	and Datum NA feet	☐ Surveved
Well casing,		☐ Estimated
2 inch diameter, Schedule 40 PVC	Installation Date(s) 05-28-92	
Backfill Portland/Bentonite	• •	•
Grout Gel - 13.8 lb/gal	· ·	ering
4.25_ft* /	r	
	Development Technique(s) and Date(s)	
Bentonite ☐ slurry 5.25_ft* ■ pellets	Hand bailed 06-02-92	
6.25 sugar sand		
7.25_ft*	Fluid Loss During DrillingN	
	Water Removed During Development	-
Well Screen.	Static Depth to WaterNA	feet below M.
inch_diameter 	Pumping Depth to Water NA	feet below M.
	Pumping Duration NA hours	
Gravel Pack	Yield NA gpm	Date NA
Sand Pack (20/40) Formation Collapse	Specific Capacity NA gpm	
Pormation Collapse	Well Purpose <u>Ground-water monito</u>	TING METT
Gravel Pack Sand Pack (20/40) Formation Collapse	-	
	Remarks	
17.5ft*	nemarks	
_		
Measuring Point is		
Top of Well Casing		·
Unless Otherwise Noted.		
*Depth Below Land Surface		
	Prepared by Kipper Montgomer	у

G&M Form 05 12 88

GERAGHTY & MILLER, INC. Resignmental Services
A MILLER, INC.
Environmental Services

Borin	g/Well		8 -10	Project/No	CHEVRON	(LASS4.01)			Page	1	of1
Site Locat	ion		t of Landii			Drilling Started _	05-27-02	14:00 Drillie Com	~		92 15:00
Land	Surfac	e Elev.		feet	□ Surveyed	☐ Estimated	Date	JM			
Orillin	g Fluid	Used		Hone			Drill	ing Method	Hol	ow Sten	1
Drittin	¢		F	ustis Engineering		. Driller	Phare		1	Rev/E	ide .
Prepa						Dringer		/mer	Hamme		
Ву_			К	ipper Montgomery	<u> </u>	 		ght NA	_ Orop _	NA.	inches
\sim			SEN Clay	IIII san	THI Sent S	R Sity Sand		Shelby Tube	₩.	tor Elect	Encountered
				_							
	Clay		Sandy Clay	Clayey Sit	Sand	Clayey Sand	\square	Split Spoon	▼ Wa	ter Lave	After 10 Min.
	T		 					 	т-		
SAMPLE DEPTH (Feel)	SAMPLE	RECOVERY	SYMBO		VISU			USCS	PP	OVM	REMARKS
385	3 ≥	3 3	SYL		DESCRIP	THON		(LL/PL/PI)	(HVV)	(ppm)	HEMMINAS
	-	-			·						
۰ —		7	7777	Clay, hard, da	rk brown.			 	1		. •
1 -		ŀ			ı, brown, loose.		•		4.0/4.0	٥	
2 -		1									
1 -		2.5		Silt, brown, loc	se, dry layer (6").				-		
•			////	Silty day (30%), brown to gray, acy fine	natural organics, ferror	JIS .		3.0/2.5	1.2	
4 -				Sandy sift (13°	%), dry, not conso	lidated, brown.			1		,
5	11	2.0		Clay, moist, na	atural organics, fin	m, gray.			-		-
6 -						-		ļ			
7 -		1									▽ .
		2.5						1		4.4	•
						anics, I.e., roots, gray,			1		•
9 —				soft, very mois	L						•
10 —		2.5		'							-
11 -				- very soft	gray, very moist.					291	
12 -						•		,			
17 -											
		3.5	- { { } } } } }	Sandy silt, ven						.	_
14 -		1.0			my, very fine, wet	<u> </u>					•
_		ļ		Total Depth -	14.5 ft ble					.	_
-			1 1								
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_		1								1	
	ŀ		1 1							' Ì	
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(UNCONSOLIDATED)

۳	T 2-	Project Che	evron Che	<u>emical LA55</u>	<u>4.01 </u>	II LMS-	- 10
	ft 2.5	Town/City	Belle (Chasse			
	LAND SURFACE	i -		mine		te LA	
И	1						
	101/2 inch diameter	Land-Surface	Elevation				
И	drilled hole	and Datum _	NA	_ feet	□s	urveyed	
И	Well casing,					stimated	
И	2 inch diameter, Schedule 40 PVC	Installation Da			· · - ·		
\mathcal{L}	Portland/Bentonit	l e Drilling Metho	od	Hollow St	em		· · · · · · · · · · · · · · · · · · ·
И	Grout Gel = 13.8 lb/gal	Drilling Contra	actor	Eustis En	gineering		
И		Drilling Fluid .		None		<u> </u>	
	1.83_ft*						
	· ·	_	-	(s) and Date(s)		
	Bentonite ☐ slurry 2.83 ft* ☐ pellets	Hand ba	iled 06-	-03-92			
	-3.33 sugar sand				 _		
					ΝΔ		
							_
	Noll Carea		_	Development NA			-
	Well Screen. 2 inch diameter PVC 0.010 slot			NA			
	PVC,0.010_slot			NA h		,66	A DEIOW IVI.
		YieldNA			00.3	Date	NA
	Gravel Pack Sand Pack (20/40)			NA	_ apm/ft		
	Formation Collapse	Well Purpose	Groun	nd-water mor	nitoring	well	
					 		
	14.25 _{ft} *						
	14.5 ft*	Remarks	·				•
				 :	<u>.</u>		
	-	 	. 			<u>-</u>	
	Measuring Point is	-					
1	Top of Well Casing Unless Otherwise Noted.	<u> </u>					
•			 				
	*Depth Below Land Surface	Prepare	adby Ki	pper Montgo	omery		

JEF GERAGHTY	
GERAGHTY & MILLER, INC. Environmental Services	
Emirenana Services	

Boris	ng/Wel	<u> </u>	48-1	1	Project/No	CHEVRON	(LA554	.01)			Page	1	of 1
Site	tion _				3 & Landille C			Drilling Started	05-29-92	Ď	rilling ompleted		
Land	-Surta	ce Elev	<i>.</i> _		19 et	□ Surveyed		Estimated	Dat	um	···		
		d Used	l		None				Drill	ing Method _	Holi	ow Stem	
Drillin	À			E	ustis Engineering			Orliler	Phan	oh .	Helper	Rev/E	rio
Prep						•				nmer	Нальте		
Ву				K	pper Montgomery	 			Wel	ght <u>NA</u>			inches
\$ \$	FIII				Sitt	Sandy Si	• 🔟	Silty Sand		Shelby Tube	→ ▽ Wa	ter First i	Encountered
	Clay	Z_2	Şer	ndy Clary	Clayey Sitt	Sand		Clayey Sand	M	Split Spoon	▼ Wa	ter Level	After 10 Min.
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY	(Feet)	SYMBOL		VISUA	_			USCS (LL/PL/PI) (HVV)	OVM {ppm}	REMARKS
۵ ــ								<u> </u>					
		1	1	~~~	Fill, clay, shells	l.					4.0/4,0	0.0	_
2 -					Clay, very hard	i, brown, ferrous o	concretto	ons, some root	lets.			3.5	
3 -		2.5	5		Silty day (20%), gray to brown.				 	_		
			t		- silt seam - hard, bro			•		Ì	3.25/3.25	0.0	
		2.5	. t		- nac, oro	4 11.]]]	
5 —	i_{ij}^{μ}	7 "	ť		- 11 4 4 4 4					ĺ	[0.0	-
6 -		}	ŀ		- sity (40% soft	i), very moist, bro	wn to gr	ay, famous sta	ining,	}		0.0	•
7 -	- 88		_ }		• • • • • • • • • • • • • • • • • • • •					}		i	∇
8 -		2.	5		- wet, soft.	wet, slightly clay	m (294)						
9 -						itty clay (40%), w	• •		•				,
10		2.5	5		Sity sand, wet	·				 	-{ !	l	-
11 -		3	į		Silty day (ADS)),sandy (trace), g	row wat	····		 			-
12 -		4	Į.	////				 _					
13 ~					Silty sand (40%	o), gray, war	•]	•
		3.5	5	121212	Total Depth - 1	13.5 ft bla				 		İ	
-	1	-	-		•							1	•
_	1		- 1					•			i		-
-	1	1	l	į			•				- (- (•
-	·	}	ı										
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_		}	- }								1	1	
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(UNCONSOLIDATED)

	Project Chevron Chemical	1 - LA554.01 _{Well} LMS-11
O ft	Town/CityBelle Chas	sse
T T T T T T T T T T T T T T T T T T T	County Plaquemine	State LA
	Permit No. NA	
10½ inch diameter	Land-Surface Elevation	
dulled note	and Datum NA feet	□ Surveyed
Well casing,		☐ Estimated
2 inch diameter, Schedule 40 PVC	Installation Date(s)05-	-29-92
Schedule 40 PVC Backfill Portland/Bentonite Gel - 13.8 lb/gal	Drilling Method Hol	llow Stem
Grout Gel - 13.8 lb/gal	Drilling Contractor Eus	stis Engineering
ИИ	Drilling Fluid Nor	ne
0.83 ft*		
Bentonite 🗆 slurry	Development Technique(s) and	
1.83 ft* pellets	Hand bailed D6-03	D-92
2.33 sugar sand		
7.25	Fluid Loss During Drilling	NA gallor
3.25 ft*	Water Removed During Develop	omentgallor
Well Screen.		NA feet below M.
Well Screen. 2 inch diameter PVC , 0.010 slot Gravel Pack Sand Pack (20/40) Formation Collapse		NA feet below M.
	Pumping DurationNA	
Gravel Pack	Yield NA gpm	Date NA
Sand Pack (20/40)	Specific Capacity NA	gpm/ft
Formation Collapse	Well Purpose Ground-wa	ater monitoring well
13.25 ft*		
13.5 ft*	Remarks	
Measuring Point is		
Top of Well Casing	•	
Unless Otherwise Noted.		
*Depth Below Land Surface		
l	Prepared by Kip	oper Montgomery

△ GERAGHTY
& MILLER, INC.
Emironmental Services

Borin	ng/Well			. Project/No	CHEVRON		·			Page	t	of 1
Site	ion _	Here I		of Landfill C	'S of NW Come	of Drilling Started	05-27-92	11:30	Drillin	Y7		
Land	-Surfac			feet		☐ Estimated		um				
Origin	g Fluid	Used .		None			Drill	ing Metho	d	Holl	ow Sten	1
Drillir	ng Tarahar		E	ustis Engineering		, Dritter	Phare	oh .	ء لنا	iper	Rev/I	ric
	ared			Ipper Montgomery			Han	nmer		Hamme		
By _							Wel	ght	NA	_ Drop _	<u>NA</u>	inches
\sim	Fil	7 77 :	Sitty Clay	Sm [Sandy Stit	Silty Sand		Shelby 1	ube	♥ Wa	ter First	Encountered
		==		Clayey Sitt	Sand	Clayey Sand	$\overline{\Box}$	Split Spo	ort	▼ Wa	ter Leve	After 10 Min.
		<u> </u>			757)		نكن					
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY	SYMBOL		VISUAI			US (LL/P		PP (H/V)	(ppm)	REMARKS
· -		7										
, _				Slit, dead vegeta				<u></u>		3.5/3.0	0	
	4 1			Clay, dark brown	., hard, some na	tural organics.	_			1		•
		2.5		Silty day (20%), - silt breaks.	brown, stiff, root	iets.	<u> </u>			4.04.0		
] 3 -				- 40% silt), then alternatin	no dav-silt		}				•
4 -	30			- less silty (20°	%), gray, moist i	n fractures, abundant	natural			1.5/1.5	0	•
5 —	7.35	2.5		organics.		•		l				-
6 -				- soft, gray, sil	ty (30%), rootlet	s, very moist.						
7 -		2.0]		0.75/0.75	۰۰	▽ .
8 -		2.0		- brown, silty,	wet clay, very so	oft.						•
۰ و				- roots (large).				İ		x0.25/<0.25		-
10 —		2.0		- gray, very so	ed natural organ	alan a ganisê		İ		}		_
11 -		1			ery soft, gray, ro				-	<0.25		
12 –			222		<u>- </u>							
13 -				Sandy silt (40%)	, very nne, gray,	MAE		 				_
_		3.0	15151515	Total Depth - 13.	.5 ft bla					}		_
٠											1	_
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(UNCONSOLIDATED)

	□ ∓	Project Chevron Chemical LA554.01	Well LMS-12
	2 ft LAND SURFACE	Town/City Belle Chasse	
	ИИ	County Plaquemine	State LA
		Permit No. NA	
	10½ inch diameter	Land-Surface Elevation	
	drilled note	and Datum NA feet	☐ Surveyed
	Well casing,		☐ Estimated
	2 inch diameter, Schedule 40 PVC	Installation Date(s) 05-27-92	
	Backfill Portland/Bentonit	e Drilling Method Hollow Stem Drilling Contractor Eustis Engin	
	Grout Gel - 13.8 lb/gal	Drilling Contractor <u>Eustis Engin</u>	eering
	ИИ	Drilling Fluid None	
	0.83 4.		
		Development Technique(s) and Date(s)	
	Bentonite ☐ slurry 1.83 ft ■ peliets	Hand bailed 06-03-92	
	2.33 sugar sand		
	2155 Sugar Sund	<u>.</u>	
	3.25 ft*	Fluid Loss During DrillingN	-
		Water Removed During Development	
	Well Screen. 2 inch diameter	Static Depth to WaterNA	
	PVC , 0.010 slot	Pumping Depth to Water NA	feet below M
		Pumping Duration NA hours Yield NA gpm	Date NA
	Gravel Pack	Specific Capacity NA gpm	
	Sand Pack (20/40) Formation Collapse	Well Purpose Ground-water monitor	
		wenr urpose	2.19 11022
	_13.25_ft*		<u> </u>
		Remarks	,
	13.5ft*		
	Measuring Point is		
	Top of Well Casing		
1	Unless Otherwise Noted.		
	*Depth Below Land Surface	***	
	,	Prepared byKipper Montgome	ry

G&M Form 05 12 88

GERAGHTY
& MILLER, INC.
Emironment Services

Borin	g/Weil		-13	Project/No	CHEVRON	(LA554.01)			Page	, 1	of1
Site				Treatment Plant	•	Drilling Started	05-20-02	13:55 Com	na		
				foet	☐ Surveyed						
Oritin	g Fluid			None			Dri0	ng Method			
Drillin Contr	g actor			ustis Engineering		Driller	Phare	· h н	elper	Rev/E	irle
Prepa By _	red		. K	Ipper Montgomer)	1		Han	imer	Harrime _ Orop _	r	inches
~~~			. 01	11111 em	HH sades	, [TT] SILVES	,				
尝	Fil	تعنعت	ity Clay	<u></u>	<u> </u>	Silty Sand		Shelby Tube			Encountered
	CIRY		encry Clary	Clayey Sitt	Sand	Clayey Sand		Split Spoon	- ₩8	iter Leve	After 10 Min.
SAMPLE OEPTH (Feet)	SAMPLE	RECOVERY (Feet)	SYMBOL	,	VISUA			USCS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMARKS
۰ –		-	2000								_
1 -				Grass. Sandy clay (2)	0%), shells abunda	ant, dry, brown, natura		<del> </del>	†		-
2 -	1.5			organics.					}	0.0	_
з –		1.25									· -
4 -				- trace of s	ilt, gray, slightly m	iolst, some rootlets, so	ft to	!		1.0	-
5 <b>—</b>	L	1.0		medium st	irt.			ļ			-
8 -				Silty day (20%	6), moist, soft.		<del></del> _		┨		-
7 –	i.	2.0				us staining, wood fragn	пепіз.			1.2	-
8 <b>–</b>				. elle manka	ts, very moist to w						-
9 -				•	lay, firm to stiff.		•				▽ -
10 —		2,5		- sity, very	moist, gray, roote	ets.				. ]	_
12 _		1					i	-			
13 —				- skty (25%	o), very fine, gray,	wet					-
_	-	3.5	12/2/21	Total Depth -	13.5 ft ble	<del></del>			1		-
_							i				_
-										,	
-											-
_				!							-
_											-
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. <b>-</b>				•							_
_											_
_											_
									_		



(UNCONSOLIDATED)

<b>п</b> т	Project Chevron Chemical LA544.01 Well LMS-13
2 ft LAND SURFACE	Town/City Belle Chasse
T T LAND SDAY ACT	County Plaquemine State LA
ИИ	Permit No. NA
101 inch diameter	Land-Surface Elevation
drilled hole	and Datum NA feet □ Surveyed
Well casing,	□ Estimated
2 inch diameter.	Installation Date(s)05~20~92
Schedule 40 PVC	te Drilling Method Hollow Stem
Backfill Fortiand Bertonia  Grout Gel = 13.8 lb/ga	Drilling Contractor Eustis Engineering
- CIOON	Drilling Fluid None
	Similar Idia
0.83 ft*	Development Technique(s) and Date(s)
Bentonite ☐ slurry	Hand bailed 06-03-92
1.83_ft* <b>1</b> pellets	
2.33 sugar sand	
	Fluid Loss During Drilling NA gallor
3.25 ft*	Water Removed During Development 7.5 gallor
Well Screen.	Static Depth to Water feet below M.I
2 inch diameter PVC 0.010 slot	Pumping Depth to Water NA feet below M.I
siot	Pumping DurationNA hours
Gravel Pack	Yield NA gpm Date NA
Sand Pack (20/40)	Specific CapacityNA gpm/ft
Formation Collapse	Well Purpose Ground-water monitoring well
13.25 ft*	
13.5_ft*	Remarks
•	
•	
Measuring Point is	
Top of Well Casing Unless Otherwise Noted.	
*Depth Below Land Surface	
	Prepared by Kipper Montgomery

GAM Form 05-12-88 Scattering 191-0978

40-26 Between 5-1+15-8

LOG OF BORING

PROJECT: Solid Waste Landfin

LOCATION: 25-Acre Property, Belle Chasse, Louisiana

.ORING:

B-7.

FILE:

90B465C-4

DATE:

2/13/90

TECHNICIAN: RES

	т-т	Dry Auger		uisiana o 3'				Wash Bored: 3' to 50'
12	=	Free was			ata de	nth of	31 4	ing dry augering.
OEPTH (FEET)	SYMBOL	i rice wa	ici encou	uterea	at a ut	.pen or	J (141	ing dry augering.
<u>п</u>	8	of Coordinate	es: N 4	15 148	E 2,41	8 206		Ground Surface Elevation: 6.3
	1	·SPT	Comp.	Moist.	Dry	L.L.	P.I.	Ground Strike Dievation. V.S
	1 1	(b/ft)	Strength (tsf)	Content (%)	Density (pcf)	(%)	(%)	Description of Stratum
0 —			(631)	(70)	(per)			Medium gray and brown CLAYS with silt pockets and stree
-				ļ		İ		and ferrous nodules (CH)
-			0.49	35	82			Solt to medium gray and brown Silty CLAYS with clay
_				<u> </u>				pockets, roots, sand pockets and ferrous nodules (CL)
5 —				50		73	46	Soft to medium gray and tan CLAYS with silt pockets and
_		•	0.64	44	77	1		ferrous nodules (CH)
-			0.04	"	''	1		
-				39	·	38	15	Soft gray and brown Silty CLAYS with ferrous nodules [C
-						-		,
10	ĬΫ́							Loose gray Sandy SILTS with clay (ML)
_				<u> </u>				
_		ľ		30				
			,	ł		-		
15 —	11 1.5	5 b/f (1)		}	) )			
-		4	•			1		
_		3 b/f		<b>[</b>		1		
_		<del>-</del>		<u> </u>				Firm gray Silty SANDS with clay pockets (SM)
-		10 b/f		ļ				(5.3.7)
20		16 b/f (2)	• '					
		10 5/1 (2)		Ì			•	
		21 b/f						
		<b></b>						
25 —		2 b/f		1				Soft to medium gray and green-gray CLAYS with shell fragments and sand pockets (CH)
-		1	0.69	55	66			iragments and sand pockets (On)
-						)		
-				12		42	24	Intermixed layers and lenses of very soft gray CLAYS, San
•^	////			}				SILTS, and Silty SANDS (CH/ML/SM)
30 —			0.23	38	78			
	#							
_	777			38		1		
_	7//			1		İ		
35 —	11							
-				51		81	52	
_	222					-		with black sand lenses, 37' to 38'
-		11 b/( NR						
-		" PER STEAM		1	1			

(1) 83.5 percent passing the No. 200 sieve.

(2) 42.8 percent passing the No. 200 sieve.

NR = No Recovery.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants -

LOG OF BORING B-7 BORING: PROJECT: Solid Waste Landfill 90B465C-4 FILE: LOCATION: 25-Acre Property, Belle Chasse, Louisiana 2/13/90 DATE: TECHNICIAN: RES Chevron Chemical Company CLIENT: Belle Chasse, Louisiana PAGE: 2 of 2 DEPTH (FEET) SYMBOL Moist Dry Content Density Dry Comp. Strength (tsf) L.L. P.I. (b/ft) Description of Stratum (%) (%) (%) (pcf) Soft to medium gray Silty CLAYS with organic silts and fine 7 b/f (CL) 13 Alternating layers of medium to stiff gray CLAYS, Clayey 26 SILTS and firm Sandy SILTS (CH/ML) 32 55 33 Medium to stiff gray and light gray CLAYS with sandy silt layers, streaks and pockets Bottom of boring at 50" Borehole grouted full depth Unified Soil Classifications based on limited laboratory test data and visual observations.

LOG OF BORING

PROJECT: Solid Waste Landi...

BORING:

B-8

LOCATION: 25-Acre Property, Belle Chasse, Louisiana

FILE: DATE: 90B465C-4 2/13/90

TECHNICIAN. DES

			•					TECHNICIAN: RES
CLIE	NT:	Chevron	Chemic	al Com	рапу			APPROVED: XX PAGE: 1 of 2
			hasse, Lo					
_ ^	يا ر ا	Dry Auger					a. 1	Wash Bored: 2' to 50'
DEPTH (FEET)	SYMBOL	Free wa	ter encou	ntered	at a de	epth of	2' dur	ring dry augering.
9 %	37	0001011100			E 2,41	8,082		Ground Surface Elevation: 6.2
		SPT (b/ft)	Comp. Strength (tsf)	Moist. Content (%)	Dry Density (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
°-		/ <del></del> -		31		55	32	Soft to medium brown, tan and light gray CLAYS with silt
-			0.39	. 37	76			pockets and ferrous nodules (CH)with roots to 2'
-			0.47	58	67			with wood pockets and organic matter, 4' to 6'
5 -				54			,	
<b>†</b> -								
-		(1)		38	84	47	26	Soft gray Silty CLAYS with clay layers, silt pockets and streaks and a trace of fine sand (CL)
- 10 -			0.32	40	76			Intermixed layers and lenses of soft gray Silty CLAYS, Clayey
		(0)						SILTS, and CLAYS with a trace of fine sand
-		(2)						(CL/ML/CH)
-								Firm gray Sandy SILTS with a trace of clay (ML)
15 -		11 b/f	-					
		18 b/f			İ			·
-								
} -		16 b/f (3)						
20		25 b/f						Firm gray Silty SANDS with a trace of clay (SM)
[ -	$\mathbb{N}$	30 57.						
} -	排权	24 b/f (4)					•	loose below 24'
} -								10050 5010 4 2 4
25 -	$\mathbb{H}\mathbb{X}$	5 b/f						
		2 b/f						Soft gray CLAYS with shell fragments (CH)
-		·		59				with a trace of silt to 28'
} -				"				with sandy silt pockets and streaks below 28'
- 30 -			<del></del> -	28		35	7	Intermixed layers and lenses of soft gray CLAYS, loose Silty
								SANDS; soft Silty CLAYS and Clayer SILTS
[ -		(5)	0.22	24	90			(CH/SM/CL/ML)
-			0.54	45	72			
- 35 -	222		0.01					
-				30				
			<u> </u>	ļ				Discount of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the city of the ci
L _	# T	9 b/f (6)		l				Firm gray Sandy SILTS with traces of clay (ML)

Continued Next Page (1)  $Kv = 4.46 \times 10EE(-7)$  cm/sec. (2) 88.4% passing the No.200 sieve. (3) 77.7% passing the No. 200 sieve. (4) 9.4% passing the No. 200 sieve. (5) Unconsolidated, undrained triaxial compression test run at 12.1 psi confining pressure. (6) 72.5% passing the No. 200 sieve.

Unified Soil Classifications based on limited laboratory test data and visual observations.



LOG OF BORING

PROJECT: Solid Waste Landfill

LOCATION: 25-Acre Property, Belle Chasse, Louisiana

BORING:

B-8

FILE:

90B465C-4 2/13/90

DATE:

TECHNICIAN: RES

APPROVED: PAGE:

2 of 2

Chevron Chemical Company CLIENT: Belle Chasse, Louisiana

OEPTH (FEET)	SYMBOL				•			· ·
		SPT (b/ft)	Comp. Strength (tsf)	Moist. Content	Dry Density (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40	1	<del></del> -	(60.7	(70)	(201)			Firm gray Sandy SILTS with traces of clay (ML)
45 —		(1)	1.01	29	86			dense with wood fragments and organic material below 43'
				28		38	16	Medium to stiff gray Silty CLAYS with some fine sand, clay pockets and a trace of organic matter (CL)
so –			<del> </del>					Bottom of boring at 50'  Borehole grouted full depth

(1) Unconsolidated, undrained triaxial compression test run at 16.0 psi confining pressure

Unified Soil Classifications based on limited laboratory test data and visual observations.





(UNCONSOLIDATED)

Γ _{ft} 2.5	Project Chevron Chemical - LA385.01 Well Town/City Belle Chasse	56
LAND SURFACE	County Plaquemines State Lo	uisiana
ИИ	Permit NoN/A	
	Land-Surface Elevation	
drilled hole	and Datum 6 feet Surveye	d
Well casing,	and Datem	
· // // 4 inch diameter	Installation Date(s) 3/6/91	,-
PVC Incircularitation,	Drilling Method Hollow Stern	
Backfill Grout	Drilling Contractor Eustis Engineering	
Groot	Drilling Fluid N/A	
ИИ		
Bentonite □ slurry  17.5 ft* ■ pellets	Development Technique(s) and Date(s) N/A	-
19.5_ft*	Fluid Loss During Drilling N/A Water Removed During Development N/A	ga
Well Screen.	N/A	gal feet below
	Pumping Depth to Water N/A	
<u>PVC</u> , <u>0.010</u> slot	Pumping Duration N/A hours	_ 1001 DG1044
	51/A	ate N/A
Gravel Pack Sand Pack	Specific Capacity N/A gpm/ft	
Formation Collapse	Well Purpose Monitor well for landfill area	1
24.5 ft•	·	
27.5 ft	Remarks Had trouble sampling after 22.0 du sand coming into the augers. Samp	ue to
•	clay at 27.5 to ensure lithology t	
Measuring Point is Top of Well Casing Unless Otherwise Noted.		
*Depth Below Land Surface	Prepared by Mike Manuel	

Prepared by _

GERAGHTY
& MILLER, INC.
Ground-Water Consultants

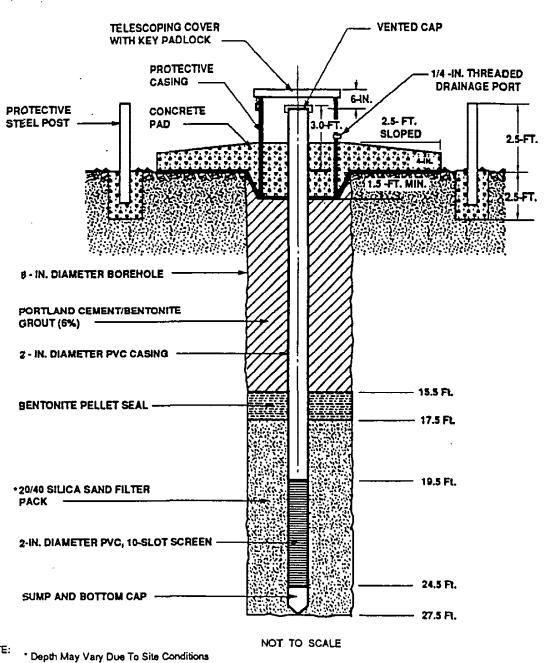
# MONITOR-WELL CONSTRUCTION DIAGRAM

BORING NO.

MW - 56

PROJECT

CHEVRON CHEMICAL CO.
Belle Chasse, Louisiana



NOTE:

NOTE: All Depth Measurements in Feet Below Ground Surface



(UNCONSOLIDATED)

OFt LAND SURFACE	
8½ inch di drilled hole	ameter
Well casing,	
Schedule 40 P	iameter, VC
Backfill Portland Bentonite	
13.8 lbs/	gal
7.5 ft*	
Bentonite ☐ slurry 9.5 ft* ■ pellet	, :S
12.00 11.66 n°	
Well Screen.	
2 inch diar   PVC , 0.010	neter
Gravel Pack Sand Pack (20)	'40)
Formation Collaps	6 <b>e</b>
17.00 n	
17.33 ft*	

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Chevron Chemical	LAU864.001	Well_	MW-EDA-01
Town/CityBelle Cha	sse		
County Plaquemin	е	_State_	LA
Permit No.		_	
Land-Surface Elevation			
and Datum feet		□ Surv	reyed ·
		☐ Estir	mated
Installation Date(s)	August 4;	1994	
Drilling Method	Hollow St	em	·
Drilling Contractor	Eustis En	gineer	ing
Drilling Fluid	NA	·	<del></del>
			·
Development Technique(s) an	d Date(s)		•
August 5, 1994		· <del></del> ,	
		<del></del> -	
Fluid Loss During Drilling	None		
Water Removed During Develo		10	gallon
Static Depth to Water			
Pumping Depth to Water			feet below M.F
Pumping Duration N/A	hours		
Yield N/A gpm			Date N/A
Specific Capacity N/A			
Well Purpose Upper clay	groundwate:	r moni	toring_well_
Remarks Pre-installation			
riser and screen = 17			
material consisted of			
0.010-in slotted scree			
of 20-40 filter sand,			
bentonite pellets, add Grout formula: 3-94 1			
gals of water to 14.1	lbs of bent	conite	gel (5%).
Prepared by K	. Montaomer	/	

4	GERAGHTY & MILLER, INC.
Æ	Environmental Services

Borin	g⁄Welli.	MW-E	DA-1	Project/No. CHEVRON	CHEMICAL COMPANY (LA	0864.003)	F	,sõe	1	of1
Site Locati			esse, Loi	ulsiana	Drilling Started	08-03-94	1535 Drilling		08-03-9	4 1645
	~··	Elev.	110			Datur				<del></del>
		Used	NA					low Ste	n Auger	
Drillin Contra		Eust	is Engin	eering	Driller	E He	old Hel	per	Q. Rol	inson
Prepa	_		Kipper i	Montgomery		Hami	ner	Hamme	r NA	la et
By _		771		(TTT)	ראיאו	Weigi		Drop _		inches
$\leq$	Fill	Sil Sil	ty Clay	Sut Sar	ndy Silt Silty Sand	<u> </u>	Shelby Tube	▼ Wa	ter First	Encountered
	Clay	Sa Sa	ındy Clay	Clayey Silt Sar	d Clayey Sand	$M$ $^{\circ}$	Split Spoon	<b>▼</b> Wa	ter Level	After 10 Min.
W - ~	щ	T≩_	7				<del></del>			
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY (Feet)	SYMBOL	DE	VISUAL SCRIPTION		USCS (LL/PL/PI)	(HVV)	OVM (ppm)	REMARKS
<i>s</i>	S	<u> </u>	Š	<u> </u>			<u></u>			<del></del> -
o —		1	~~~	Concrete (6-inches)						_
1 -		1	<del>????</del>	Silty day, gray-brown, stiff			<del></del>			-
2 _				- sitty						-
3 –										-
4 –										-
5—										. · <u> </u>
6										-
7 -		1						·		-
8 -					• .					-
9 –		1			indant natural organics, moist	, soft,				
10 —		3.0		(10-20%)						
11 -				- tan, spherical concret	<b>lons</b>					_
12 -				- very soft, sifty (40%) l	ncreasing					
13 -		3.0	111	Clayey silt (30%), gray, so partings, very moist to wet	ft, moist, alternating clay, silt,	sand				-
14 -				hamide' and most to we				ļ		-
			1222	l						_
16 <b>–</b>		3.0		·						▼ -
18 -				Clay, abundant shells and silt partings, moist	shell fragments, gray, soft, tra	ace of				=
		]		Total Depth 18.0 ft bis						
_										
_				l						
_										_
_					,					-
-			.							_
_										_
						_				



(UNCONSOLIDATED)

•	<b>-</b>	Project Chevron Che	emical LA40003	Well	WS-1D
2.0	ft LAND SURFACE	Town/City Belle C	Chasse		
	Surface casing 14-1"	County Plaquer		State	Louisiana_
	diameter drilled hole	Permit No. NA			
	10-1 inch diameter	Land-Surface Elevation			
$\mathcal{K}_{\mathcal{A}}$	drilled hole	and DatumNA	feet	☐ Surve	ved
1/1	Well casing,			□ Estima	-
	4 inch diameter,	Installation Date(s)	February 4,		
		Drilling Method			
	Backfill Portland Gel Grout 13.5 lb/qal	Drilling Contractor			
	ft*	Drilling Fluid			
-4/		Drining ridia			·
	24.5_ft*	Development Technique	e/s) and Date/s)		
	Bentonite ☐ slurry  26.5 ft* ■ pellets		ebruary 12, 19	92	
	26.5 ft* <b>B</b> pellets		- February 13,		
		Fluid Loss During Drilling	NA NA		gallo
<b>**</b>	27.5_ft*	Water Removed During I	=		•
	Well Screen.	Static Depth to Water			
	4 inch diameter	Pumping Depth to Water			
	PVC , <u>0.010</u> slot	Pumping Duration			
		Yield NA			Date NA
	Gravel Pack Sand Pack	Specific Capacity		om/ft	
	Formation Collapse	Well Purpose Tempo			
	32.5 ft*				
	3/1.5	RemarksThe well	l is not produc	ing like	it should.
<u> </u>	34.5 ft*		evelop by bails		
	Measuring Point is				
<b>L</b>	Top of Well Casing				
1	Unless Otherwise Noted.				
	*Depth Below Land Surface				
		Prepared by	Kipper W. Mon	ntgomery	
		. •			

G&M Form 05 12-AA



Boi	ring/Wel	l	WS	-1D	Project/No	CHEVRON C	HEMICAL COMPANY	(LA400.	03)	Page	1_	of2
Site	ation	FOR	MER	WASTE	STORAGE AREA		DrillingStarted	12-14-	Drilli 91 Com	ng pieted	12-1	4-91
Lar	nd-Surfa	ce El	ev		feet				nw		-	
		d Use	ad _	<del></del>	None		<del> </del>	Drilli	ing Method	Mud Rot	ary/Hollo	w Stem
Drill Con	ing itractor			Eue	stis Engineering	· · · · · · · · · · · · · · · · · · ·	Driller _			elper	Erlc/T	<u>lm</u>
	pared			Kipp	er Montgomery	<del> </del>		Harr Weig	nmer ght <u>NA</u>	Hamme _ Drop _		inches
F~	Ĵ Fill		Sil	ty Clay	∭ siit	Sandy Silt	Silty Sand		Shelby Tube	₩:	ater First	Encountered
	7		_	indy Clay	, mm	<u> </u>	Clayey Sand		Split Spoon			l After 10 Min.
	2 0.2,	2.2.	<u> </u>	· · · · · ·			Sel crayey care		1	<b>-</b>		TARRETTO MITT.
SAMPLE, DEPTH	SAMPLE	PECOVER.	(Feet)	SYMBOL		VISUAI DESCRIPT			USCS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMARKS
0 -		$\dashv$		0000	Concrete/aspha	it shells			,			_
1	-				00,10,010,000,100	<u></u>			ļ			
2	- (2)											-
3	-			1111	Clayey Silt (30%	%), soft. sidue mixed with si	It and clay, nonaqueous			1		-
4	-			1111 8XXX	material.		ay natural organics.			4		Strong Odor
5 -		2	2.5		Only 0/27 (2010	,, o (o, g.			į			_
5	-				- soft to medi	ium stiff.						Continued _
7		<u>ا</u> ا	2.5		•							-
8 -	-											_
9 .	-				- slity sand s	eam, brownish gra	ıy (2 to 3").					▽ -
10 -		2	.5									
11 -							y, moist, white to tan residue), high natural					
12 -	· <b>  </b>	2	.5		organics.		-	!				-
13 -					- clay, natural	_						
14 -					- becoming sa	andy (10%), silty (3	30%).					_
15 -		7	ĺ		Silty Sand, daye	ey (10%), slity (25%	6), gray , wet (4.5' bls).					
17 -								i				]
18 -			į		- alternating s	seams of clay, slit,	and fine sand (moist to	wet).				]
19 -										[		
20 -		2	.5									_
21 -	-				Olav v=====:					]		4
22 -					ciay, very soft, n	noist, gray, shell la	yers within.					-
23 -		1.	.5									-
24 -	-		ļ		- trace of san	d, with clay.						4
25 —		1	.5		<u> </u>	· <u>-</u>				-		-
	1		_	_ }				!		}	)	



# SAMPLE/CORE LOC

Borir	ng/Wel	. <u>W</u>	S-1D	Project/No	CHEVRON C	HEMICAL COMPANY	(LA400.	03)	Page	2_	of2
Site . Loca	tion _	FORME	R WASTE	STORAGE AREA		Drilling Started		Drillin	0		
Land	-Surfa	ce Elev.		feet	□ Surveyed	☐ Estimated	Date	JM ML	· · · · · · · · · · · · · · · · · · ·		
		d Used .		None	· · · · · · · · · · · · · · · · · · ·	<u> </u>	Drilli	ng Method!	Mud Rota	ery/Holle	w Stem
Drillic Cont	ng ractor	4	Eu	stis Engineering		Driller _					lm
Prepa			Kip	per Montgomery				imer ht <u>NA</u>	Hamme _ Drop	r NA	inches
<u>~~</u>	Fill		Silty Clay	Silt	Sandy Silt	Silty Sand		Shelby Tube			Encountered
	Clay	_		Clayey Silt	<del></del>	Clayey Sand		Split Spoon			
	Ciay			[TJ] cusheh cur	MM Sand	Ciayey Sailo		apiii apooii	<b>▼</b> ₩a	1101 FAA	After 10 Min.
SAMPLE DEPTH (Feel)	SAMPLE	RECOVERY (Feet)	SYMBOL		VISUAI DESCRIPT			USCS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMARKS
25		<u> </u>	777	Sandy Clay, sand	h. /25%\ .c.c	aint .					-
26 -				- sanding dowr		UISE					No sample for OVM due.
27 -				- 40% sand, fin	e gray.						to water
28 –		2.5		Sand, trace of silt	, wet, gray, medic	m fine to fine, coarse.					
29 -									}		
30 —		2.5									
31 -				- no sample, us	sed to plug to drill	through.					-
32 _											-
33 -							•				_
34 –					•						_
35				- sandy clay, so	oft gray.						_
36 -				Sandy Clay, soft,	gray.				: :		-
37 _		0.5							,		_
38 –		1		Total Depth - 38.	0 ft bls.						•
											_
	]						•				_
-		1				•					_
_	ļ	ļ									-
_											_
											_
_			1								-
_											•
-	1										-
_											-
_											_
	}							· ·	}		



(UNCONSOLIDATED)

	•			
		Project Chevron Chemical	LA40003 Well	WS-2D
1	.5 ft LAND SURFACE	Town/CityBelle Chasse		
	Surface casing 14-4"	County Plaquemines		Louisiana
	diameter drilled hole			
	10-1 inch diameter	Land-Surface Elevation	_	
	drilled hole	and DatumNA feet	☐ Surv	eved
	Well casing,		☐ Estin	•
	4 inch diameter.	Installation Date(s)Feb1	ruary 6, 1992	
	PVC  Rackfill Portland Gel		Rotary	
	Backfill Portland Gel 13.8 lb/gal	<del>-</del>	is Engineering	
	KA KAF	Drilling Fluid Pota		
-	ft*		,	
	ft*	Development Technique(s) and	Date(s)	
,	Bentonite  slurry 25 ft*  pellets	Air lift - February		
	ft* Spellets			
•				·
	26	Fluid Loss During Drilling	NA_	gallo
	ft*	Water Removed During Develop		-
	Well Screen.	Static Depth to Water		
	4 inch_ diameter	Pumping Depth to Water		
	,sidt	Pumping DurationNA	hours	
	Gravel Pack	Yield NA gpm		Date NA
	Sand Pack	Specific CapacityNA	gpm/ft	
	Formation Collapse	Well Purpose Temporary W	ell	
				<del></del>
	33.5 ft*		5 -25 = 8.5 x 26	
		Pellets 20# x 2' =	40# pellets; 21'	<u>× 5.30 =</u>
		111 gallons ÷ 8.4 =	13.25 sacks cem	ent; 13.25
	Measuring Point is	x 4.7# bentonite =	62# bentonite; 1	<u> 11 gallons = </u>
)	Top of Well Casing	22 – 5 gallons buck	ets	<del></del>
,	Unless Otherwise Noted.			

Prepared by

G&M Form 05 12-88

*Depth Below Land Surface

George Cook



## SAMPLE/CORE LOG

Borin	g/Well .	ws	-2D	Project/No	CHEVRON CH	IEMICAL COMPANY	(LA400.	03)	Page	_1	of2
Site Locat	ion F	ORMER	WASTE	STORAGE AREA		Drilling Started	01-04-92	Drillir 10:15 Com	ng pleted	01-0	M-92
				feet				ım			
		Jsed _		Mud		<del></del>	Drilli	ing Method	Mı	ıd Rotaı	у
Drillin Contr	18 Tactor _		Eus	stis Engineering		. Driller	Tex	Не	elper	Har	old
Prepa	red		Kipi	per Montgomery				nmer ght <u>NA</u>	Hamme _ Drop _		inches
- v						CTCTN		_	·		
<b>₩</b>		_		سيت		Silty Sand		Shelby, Tube			Encountered
	Clay	Sa Sa	andy Clay	Clayey Silt	Sand	Clayey Sand		Split Spoon	▼ Wa	iter Leve	After 10 Min.
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY (Feet)	SYMBOL		VISUAL DESCRIPTI			USĆS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMARKS
0 —											
1 _				Fill, sand, rocks, - some clay.	sheils.				Ì	٥	_
, _	Υ.,		<b>****</b>	,		•					
, _		0	<i>????</i>	Clay shells, som	e nonaqueous mat	terial	· · · · · · · · · · · · · · · · · · ·		┨		Strong Odor
4 _				_					0.25/0.25	137 -	
5 —		2.0		- medium stit		ning with some "ferrou	ie "		0.75/0.50		
6 -	J.				medium stiff-soft.	mily with bother terror	23	•			
7 -				- more nonac	queous material in :	silty breaks in day (25	5%).			131	_
8 -		2.0				cs (rootlets), soft, gray	/	<u> </u>	-		_
9 —				to black, moist, s	iliting (30%).				0.25/0.25	11	_
10 —		2.5		•				i I			-
11 -				- soft, "sticky	, very moist, natura	al organics					▽ -
12 -				- 1147						4	-
13 -		2.5		- silting (40%	).						-
14 -				Sandy Clay (20	to 30%), gray, fine,	very moist.				0	-
15 —				Clavey Silt (20%	) moist gray incre	easing clay downward	<del></del>		<u> </u>		-
16					of sand, alternation	-	•				-
17 —		2.0		- clayey.							-
18 -			7777	Silty Clay (40%),	trace of sand.				-		-
19 -		2.0									-
20 —				Clayey Sand (40	to 60%), dark gray	y, wet, very soft to sof	t.	,	{		_
21 -				Clay, dark gray,	1/2" layer of shells	and shell fragments.			1	0	-
ZZ –				- moist, soft,	pliable.						-
23 -				- trace of san	d lenses.						-
24 _		}		- interlayered	I seams of sand an	id day, soft, moist.					-
25 —						<del></del>	<u> </u>			0	_
1		i 1						1	I	I	



# SAMPLE/CORE LOG

Borin	g/Wei	w	'S-2D	Project/No.	CHEVRON C	HEMICAL COMPANY	(LA400.	.03)	Page	2	of <u>2</u>
Site Local	ion _	FORME	R WASTE	STORAGE AREA		Drilling Started	02-06-92	Drillir 12:45 Com	ng pleted	02-0	6-92
Land	-Surfa	ce Elev.		feet				um			
Drillin Drillin		beau t		Potable Water		<del></del>	Drill	ing Method	Mo	id Roter	<u> </u>
Contr	actor		Eu	stis Engineering		Driller		<u>/</u> He			<u> </u>
Prepa By _	meq			George Cook		···		nmer ght <u>NA</u>	Hamme _ Drop _		inches
$\overline{m}$	Fill		Silty Clay	Silt	Sandy Silt	Silty Sand		Shelby Tube	<b>▽</b> Wa	ter First	Encountered
	Clay	Ź	Sandy Clay	Clayey Silt	Sand	Clayey Sand		Split Spoon			After 10 Min.
SAMPLE DEPTH (Feet)	SAMPLE	RECOVERY (Feat)	SYMBOL		VISUAI DESCRIPT			USCS (LL/PL/PI)	PP (H/V)	OVM (ppm)	REMA RKS
25—		-	7777	Increase in sand	content, trace of	dark spots, organic sta	ining.		-		
26 -						grain), medium dark g	_	<u> </u>	-		
27 –		2.5		saturated.	•	ample washed out of ta	Ť		[		▼ -
28 –				dark gray, sa		umpio wasiloo qui oi s					-
29 -		2.5									_
30 — 31 —		7 2.3		- saturated.							7
32 _				- medium ora	ined grav streaks	black, natural organic					, ]
33 -				staining, satu		s sidest, richter drydrine	,				-
34 –				Total Depth - 34	.0 ft bis.	<del> </del>				}	-
_				•							_
-										ļ	-
-		i								į	4
-				•							1
											_]
_											
_										Ì	4
-										İ	4
-											4
										İ	-
-										.	4
-								Ì			. 1
_											1
_											_]

3

Date Drilled: 3/15/83

·Location: Adjacent to MW-27

Stratigraphy:

O to 4 ft same as MW-27

9 to 15 gray clay

15 to 28 ft interbedded silt and sandy silt, grading to silty sand

28 to 30 ft sand, trace silt and clay-

30 to 32 ft gray clay

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 29 ft of 1.25-inch PVC casing. Pushed screen and casing into caved sand at bottom of hole, then added sand to 60 inches above the screen, then 6-inch bentonite seal, and cement grout to surface with tremie tube. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 10.72 ft above msl.

MW-36

Date Drilled: 3(15/83

Location: Near Chevron property line, outside fence, near Gate 3 and

MW-13

Stratigraphy:

O to 3 ft brown fill with shells

3 to 6 ft dense gray mottled brown clay

5 to 9 ft gray silty clay with roots and twigs

9 to 14 ft gray clayey sandy silt

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 10 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 5.30 ft above msl.

GERAGHTY
& MILLER, INC.
Environmental Services

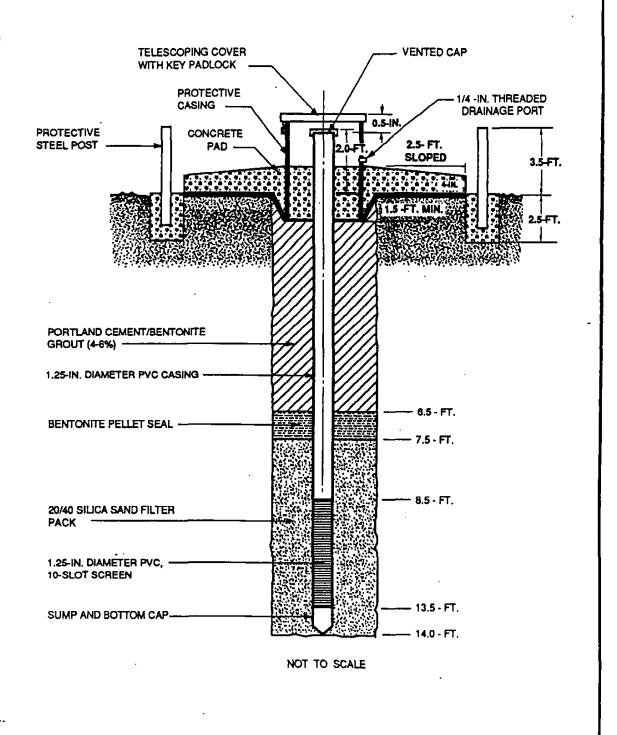
# TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-36

PROJECT

CHEVRON CHEMICAL CO.
Belie Chase, Louisiana



NOTE: All Depth Measurements in Feet Below Ground Surface

LA171,02-MW-36

Date Drilled: 3/15/83

·Location: Adjacent to MW-27

Stratigraphy:

0 to 4 ft same as MW-27

9 to 15 gray clay

15 to 28 ft interbedded silt and sandy silt, grading to silty sand

28 to 30 ft sand, trace silt and clay

30 to 32 ft gray clay

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 29 ft of 1.25-inch PVC casing. Pushed screen and casing into caved sand at bottom of hole, then added sand to 60 inches above the screen, then 6-inch bentonite seal, and cement grout to surface with tremie tube. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 10.72 ft above msl.

MW-36

Date Drilled: 3/15/83

Location: Near Chevron property line, outside fence, near Gate 3 and

MW-13

Stratigraphy:

0 to 3 ft brown fill with shells

3 to 6 ft dense gray mottled brown clay

6 to 9 ft gray silty clay with roots and twigs

9 to 14 ft gray clayey sandy silt

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 10 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 5.30 ft above msl.

# BORING LOG

PROJECT NAMECHEVRON PROJECT NUMBER L495BC2 PAGE ____ OF ___
LOGGED BY L. COHEN APPROX. ELEV. BORING NO. 35A

COORDINATES ____ DRILLING METHOD MUD BOTONY DATE STARTED 9-24-85

GWL: DEPTH ____ ACTUAL TIME ____ DATE COMPLETED 9-24-85

CASING IN	FORMATION	61	ROUNDWATER	LEVEL DATA	
SIZE		ACTUALTIME	DEPTH	ACTUAL TIME	DEPTH
a OPVC	ra5-3a-5				
and PVC Screen	3a.5-37 <u>5</u>				
a OPVC SUMP	37.5-40.5	1			
+ Poin+				1	

		r <del>'</del>	_		٠,		
ОЕРТИ	SAMPLER	SAMPLE NO.	AND TYPE	STRATA LOG	US.C.S. SYMBOI	P WEASURED CONSISTENCY (TSF)	DESCRIPTION Se(tons/ft ² )
			(AUC.ER				Brown FILL and SHELLS ~
3	65	S-1				482	3-4 SHELL AND FILL 4-6 CLAY, wsand lenses, micaceous, med took grey, 6 oly streaks, moist
0 1	80	S-2				∞.ו	O CLAY & sand lerses, mkaceous, med todk. grey, oily streaks, moist, & Fe silty sandy layers
d. 1	85	S-3				488	AS ABOVE W WOOD
-15 -	80		¥1,L			2010	wood(woody) some black oil, moist
-//	80		c loy			20.10	11-3-18- SAND MICKERS And Tenses, V. soft, moist tower
4/	75	-	- 5he			2010	CLAY, silty and sandy interceous med grey w some It grey werses of med-fine strains and, wood pieces  21 Same as above w more sand lenses
24 -	75	-	+			40.10	
27 -	80	-				0.25	24 CLAY, silty & some sandy - Silty layers, dark grey, with shells, some black organics, moist to wet  27 zt-zg clay & sand layers, mcaceous, med grey, very soft
30	80					10.10	and wet 28-30 Sand clayey w clay lenses, med grey, med grain, microcous 30 some plack on mes and shell moist to wet 30-31.5 CLAY wished As Acove
33 -	85					10.10	22 Organics Very micaceous were wet
36	90					L0.10	organic tayers, very wet
39	90					LO.10	As Ar≘ove
405	90		4			F040	405 AS ABOVE
3TCM TRAC	_	- 5.	%				395 Thentonite 395 Thentonite 315 Theorem Sand
E IT T	LE 5 12	- 12 - 30	% %				screen
CHA		-45 -55		•			375 + sump + point



(UNCONSOLIDATED)

	Project Chevron - L0495BC2	WellMW-35A
ft 2.5	Town/City Belle Chasse	
LAND SURFACE	County Plaquemine	State LA
	Permit No. NA	<del></del>
drilled hole	Land-Surface Elevation	
V V united Hole	and DatumNA feet	☐ Surveyed
Well casing,		□ Estimated
2 inch diameter, Schedule 40 PVC	Installation Date(s) September	r 24, 1985
Backfill Portland Cement/	Drilling Method Mud_Rota	
Grout Bentonite Grout	Drilling ContractorEustis E	
5-10% Bentonite	Drilling Fluid Mud/Wate	
29.5 #*		
<u>29.9</u> π	Development Technique(s) and Date(s)	•
Bentonite 🗆 slurry	Airlift surge - September	
30.5 ft* ■ pellets sugar sand		<u> </u>
<b>#</b>		
20-40 sand	Fluid Loss During DrillingUnkn	own gallo
	Water Removed During Development	
Well Screen.	Static Depth to WaterUnkni	feet below M.
2 inch diameter 	Pumping Depth to WaterUnkne	ownfeet below M.
	Pumping Duration <u>Unknown</u> ho	ours
Gravel Pack	Yield NA gpm	Date NA
Sand Pack	Specific CapacityNA	_ gpm/ft
Formation Collapse	Well Purpose Louisiana Hazar	dous Waste Regulations
	Compliance Monitoring Wel	ls
<u>37.5</u> ft•		
40.5 ft*	Remarks	
<u> </u>	Formed filled out with in	formation from G&M
	12-30-85.	
Measuring Point is		
Top of Well Casing		
Unless Otherwise Noted.		
*Depth Below Land Surface		
	Prepared by Kipper W	. Montgomery

Prepared by ____

ARCADIS Geraghty & Miller, Inc.

## SAMPLE/CORE LOG

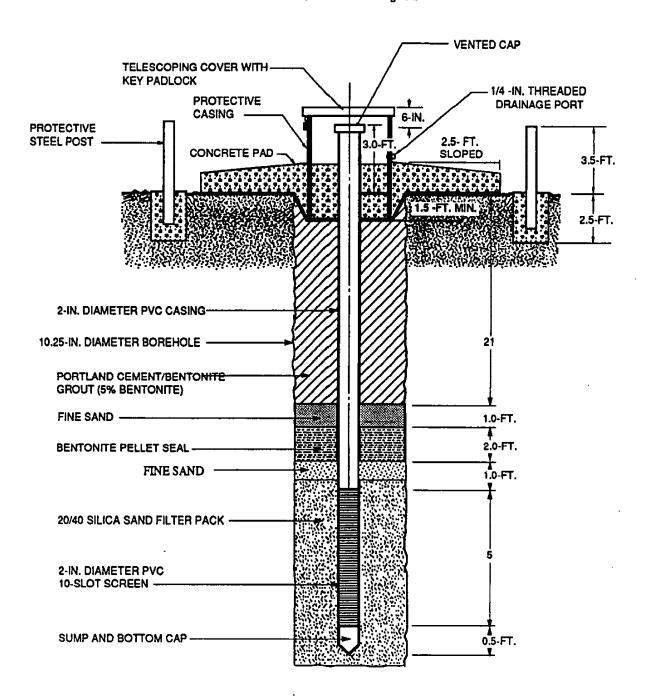
	Во	ring/We	u f	WW-	34R	Project	VNo	CH	EVRON C	HEMIC	AL COMPANY	(LA0017	03.0001)	Page	1	of2
	Sit	Α .			1880, Lou	•					Drilling Started	07/22/98		illing ompleted		
	La	nd-Surt	ace Elev	v	4		feet		Surveyed		] Estimated		um	NA	_	
	Dri	iling Flu	id Used	<b>_</b>	NA							Drill	ing Method _	Hollo	w Stem	
	Co			Fu	gro Geos	cience	5				Driller		nmer	Helper		rry
	By	epared			K. Monte	omery	,						ght NA	Harr Drop		Inches
		_			ty Clay	$\overline{\mathbf{m}}$	Silt		Sandy Silt		Silly Sand		Shelby Tube	• ▽	Water First	Encountered
		Clay	Z			==	Clayey Silt	=			Clayey Sand	$\overline{\nabla}$	Split Spoon	•	Water Leve	ol After 10 Min.
	SAMPLE DEPTH	(Feet) SAMPLE	TYPE RECOVERY	(Feet)	SYMBOL				VISUA				USCS (LUPUPI)	PP	OVM (ppm)	REMARKS
	0															
	1	-	2	2.0		Füt	materia)									-
	2	-		_		Silty	y day, gray,	dry			· · · · · · · · · · · · · · · · · · ·			-		
1	3		2	2.0							•					
	5	-	2	.o												
	6	-					<del></del>						<del> </del>	-		
	7	-	2	.0				_					<u> </u>	-		
	8	_	2	2.0												-
	10-															<u> </u>
	11		2	2.0												
	12		2	2.0												
ļ	14	_														
	15	-	2	2.0					•							-
	16 17		,	2.0												
	18			<b>U</b>												
	19	-	2	.0												
	20					Cla	y, gray, dry							-		-
	21		2	2.0												
	23	1	2	2.0		Sar	ndy silt, gray	, wet								▼.
	24		2	2.0												
	25		$\dashv$							• • • • • • • • • • • • • • • • • • • •	<u> </u>		<del>                                     </del>	-		-
- 1		<u>l</u>	1		1 †									1	_ 1	L

ARCADIS Geraghty & Miller, Inc.

# SAMPLE/CORE LOG

Boring/Well	MW-34R	Project/No	CHEVRON C	HEMICAL COMPANY	(LA001703	.0001)	Page	2 _ (	01
Site	Belle Chasse,	•		Drilling Started	07/22/98	Drill		07/22/98	
Land-Surfac	xe Elev	feet	□ Surveyed	☐ Estimated	Datun	n	NA		··
	UsedN	NA			Orilling	g Method	Hollow S	item	
Drilling Contractor	Fugro (	Geosciences		Driller			telper	Jeri	<u> </u>
Prepared By	К. М	lontgomery			Hamn Weigh		Hamme Drop _	NA_	inches
Fill	Silty C	lay Silt	Sandy Slit	Silty Sand	S	helby Tube	✓ Wa	ater First	Encountered
Clay		Clay Clayey Silt	Sand	Clayey Sand	∑ s	plit Spoon	<b>▼</b> Wa	iter Level	After 10 Min.
SAMPLE DEPTH (Feet) SAMPLE TYPE	RECOVERY (Feet) SYMBOL		VISUAL DESCRIPT			USCS (LL/PL/PI)	PP	OVM ( ppm )	REMARKS
25		1:-1:							_
26 _									-
27 -	2.0	<u> </u>		<del>-</del>					-
26									_
29 —	2.0						i		-
30-						·			_
31 —	2.0								-
32									-
33 —	0.5								-
-		Total Depth -	33.5 ft bis						-
] -		į						]	_
-									
-									-
-									-
-									-
		į				j			_
-									-
-									-
-		•							-
-									-
-						İ			_
-									-
1 -					1				-
-									-
7 -									-
-									_
				·				<u></u>	

MW-34R Monitor Well Diagram



NOT TO SCALE

Chevron Chemical Company Oak Point Plant Belle Chasse, Louisiana LA001703.0001

GERAGHTY & MILLER, INC.
Environmental Services a heidemij company

# CONSTRUCTION LOG WELL

__Well casing, 1 inch diameter,

2 PVC

To 10.28 inch diameter drilled hole

ft Land Surface

Backfill
Grout 13.9 lbs/gal

21.0 ft* Sugar Sand 22.0 ft*

<u> </u>	Chevron Chemical (LA001703.0001)  Belle Chasse	Well	MW-34R
County Permit Number I and Surface Floration	Plaquemines NA	State	ľ
and Datum 4	[eet		Surveyed Estimated
Installation Date(s) Drilling Method Drilling Contractor Drilling Fluid	7/21/98; 7/22/98 Hollow Stem Auger Fugro Geoscience, Inc. None	98 nger e, Inc.	
Development Technique(s) and Date(s)	nd Date(s) 2" Rediflo pump		
Fluid Loss During Drilling Water Removed During Development Static Depth to Water Pumping Depth to Water Pumping Duration Yield Specific Capacity Well Purpose Remarks	s None  evelopment 150  3.77 feet bel  NA hours  Replacement well for MW-34 that was damaged.	feet feet feet feet gpm/ft as dama	gallons gallons feet below M.P. feet below M.P. 7/29/98 uft
Prepared by	George Cook		

Measuring Point is Top of Well Casing Unless Otherwise Noted.

33.0

33.5

Sump

Sand Pack 20/40 Formation Collapse

Gravel Pack

Well Screen,
2 inch diameter
PVC, 0.010 slot

Sugar Sand

K Bentonite

26.0 ft*

28.0 ft*

Depth Below Land Surface

Date Drilled: 3/13/83

Location: Southwest corner of Landfarm C

Stratigraphy:

O to 2 ft brown pebbly clay fill

2 to 6 ft soft gray mottled brown silty clay to clayey silt 6 to 10 ft dense gray mottled brown clay; last 6 inches has roots Well Construction:

Installed 5 ft of 1.25-inch RVC screen and 7 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 9.78 ft above ms1.

MW-29

Date Drilled: 3/13/83

Location: South side of Landfarm C

Stratigraphy:

O to 3 ft brown clay fill

3 to 7 ft gray oil-stained mottled brown clay, soft

7 to 9 ft dense gray clay with roots and twigs

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 9.81 ft above msl.



(UNCONSOLIDATED)

	Project Chevron Well MW-29A
2 ft LAND SURFACE	Town/City Belle Chasse
The same same	County Plaquemine State LA  Permit No. NA
Unknown inch diameter drilled hole	Land-Surface Elevation
ИИ	and Datum feet
Well casing,	
Z inch diameter, Schedule 40 PVC	Installation Date(s) March 27, 1993
Backfill Portland Cement/	Drilling Method Unknown
Grout Bentonite Grout	Drilling ContractorG&M
	Drilling Fluid Unknown
	Development Technique(s) and Date(s) Unknown
	Fluid Loss During Drilling
Well Screen.	Static Depth to Waterfeet below M
2 inch_diameter PVC,0.010slot	Pumping Depth to Waterfeet below M
- 1 vc , 0.010 slot	Pumping Duration NA hours
Gravel Pack  Sand Pack	Yield         NA         gpm         Date         NA           Specific Capacity         NA         gpm/ft
Formation Collapse	Well Purpose Hydrogeologic Investigation
12.5 ft*	
_13.0 ft*	Remarks
	No original well construction log accompained
	E&E's 1983 report. All information recorded on
Measuring Point is	this document was reproduced from E&E's 1983
Top of Well Casing Unless Otherwise Noted.	(May 23) report.

Prepared by _

G&M Form 05 12-88

*Depth Below Land Surface

Sourt :

Kipper W. Montgomery

Date Drilled: 3/13/83

Location: Southeast corner main plant site, northeast of Oreco Park

Stratigraphy:

0 to 3 ft brown clay fill

3 to 9 ft gray mottled brown clay. At 6 ft is 3-inch layer soft silty

clay and at 8 ft is 3-inch layer clayey, silty fine sand.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.68 ft above msl.

#### · MW-31

Date Drilled: 3/13/83

Location: At 7th Avenue and levee, near MW-14

Stratigraphy:

O to 2 ft brown fill with shells

2 to 4 ft gray mottled brown clay; black oil discoloration

4 to 7 ft gray mottled brown clayey silt, soft

7 to 8 ft dense gray clay

8 to 9 ft moderately dense gray clay with roots and twigs

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 1.5 ft. Top of PVC casing elevation is 7.13 ft above msl.

ÿ

22

MW-30

Date Drilled: 3/13/83

Location: Southeast corner main plant site, northeast of Oreco Park

Stratigraphy:

O to 3 ft brown clay fill

3 to 9 ft gray mottled brown clay. At 6 ft is 3-inch layer soft silty

clay and at 8 ft is 3-inch layer clayey, silty fine sand.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.68 ft above msl.

- MW-31

Date Drilled: 3/13/83

Location: At 7th Avenue and levee, near MW-14

Stratigraphy:

O to 2 ft brown fill with shells

2 to 4 ft gray mottled brown clay; black oil discoloration

4 to 7 ft gray mottled brown clayey silt, soft

7 to 8 ft dense gray clay

8 to 9 ft moderately dense gray clay with roots and twigs

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 1.5 ft. Top of PVC casing elevation is 7.13 ft above msl.



(UNCONSOLIDATED)

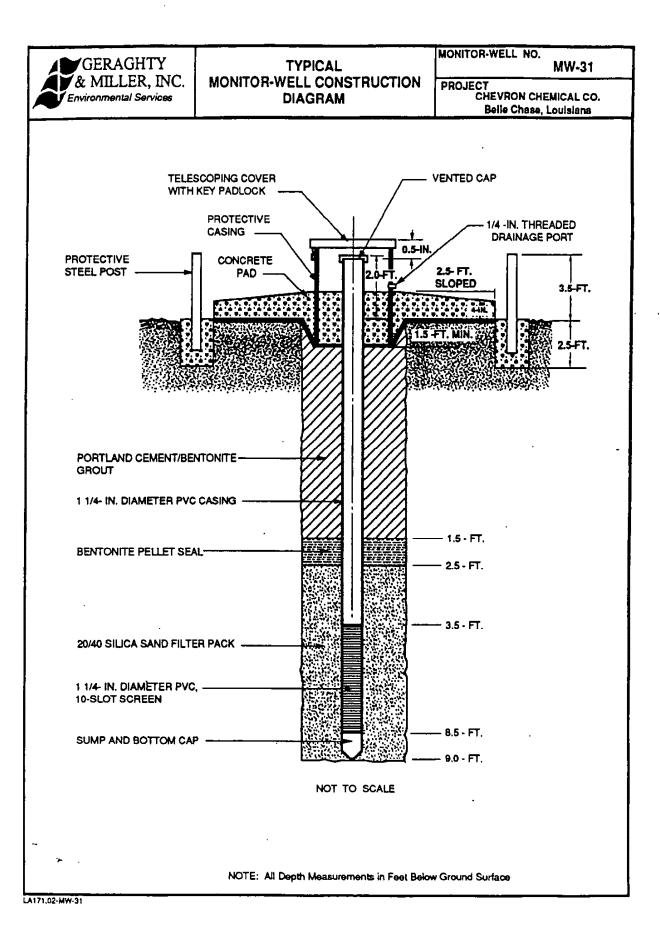
· · · · · · · · · · · · · · · · · · ·	Project Chevron Chemical - LA554.0 (Well MW-31
ft 1.5	Town/City Belle Chasse
	County Plaquemine State LA
ИИ	Permit No. NA
<u>Unknown</u> inch diameter	Land-Surface Elevation
drilled hole	and Datum 7.13 feet (msl) Surveyed
Well casing,	
1.25 inch diameter, Schedule 40 PVC	Installation Date(s) March 13, 1983
Backfill Portland Cement/	Drilling MethodUnknown
Grout Bentonite Grout	Drilling Contractor Ecology & Environment, Inc.
ИИТ	Drilling Fluid Unknown
2.5 ft•	
	Development Technique(s) and Date(s)
Bentonite ☐ slurry  3.0 ft* ■ pellets	Unknown
3.5 ft*	Fluid Loss During Drilling Unknown galle
	Water Removed During Development Unknown gallo
Well Screen.  1.25 inch diameter	Static Depth to Waterfeet below N
PVC , 0.010 slot	Pumping Depth to Water <u>Unknown</u> feet below M
	Pumping Duration <u>Unknown</u> hours  Yield <u>NA</u> gpm Date <u>NA</u>
Gravel Pack	Specific Capacity NA gpm/ft
Sand Pack Formation Collapse	Well Purpose <u>hydrogeologic Investigation</u>
	Went dipose
<u>8.5</u> n·	
	Remarks
<u>9.0</u> ft*	No orginial well constrctuion log accompanied
	E&E's 1983 report. all information recorded on
Monouvine Beint in	this document was reproduced from E&E's 1983
Measuring Point is  Top of Well Casing	(May 23) report.
Unless Otherwise Noted.	
*Depth Below Land Surface	

Prepared by _

G&M Form 05 12-88

South:

Kipper W. Montgomery



Date Drilled: 3/13/83

Location: At 10th Avenue and G Street, near MW-19

Stratigraphy:

O to 2 ft brown shells and clay fill; oil discoloration

2 to 4 ft moderately dense gray mottled brown clay; oil discoloration

4 to 10 ft gray clay with roots and twigs, soft

10 to 12 ft gray clayey silt, soft. Last 1.5 ft of hole caved in.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 7 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 7.04 ft above msl.

MW-34

Date Drilled: 3/14/83

Location: Adjacent to MW-33

Stratigraphy:

0 to 9 ft same as MW-33

9 to 19 ft soft gray clayey silt to silty clay

19 to 26 ft gray silt to sandy silt

26 to 31 ft gray silty sand

Well Construction (hollow-stem auger):

Installed 5 ft of 1.25-inch PVC screen and 29 ft of 1.25-inch PVC casing. Pushed screen and casing into caved sand at bottom of hole, then added sand to 24 inches above the screen, then 6-inch bentonite seal, and cement grout to surface with tremie tube. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 5.86 ft above msl.



(UNCONSOLIDATED)

П	·		- LA554.01 WellMW-32
2	ft LAND SURFACE	Town/City Belle Chasse	
		County Plaquemine	StateLA
		Permit No. NA	
	Unknown inch diameter drilled hole	Land-Surface Elevation	
U $U$	dilled hole	and Datum7.04 feet	□ Surveyed
ИИ	∼Well casing,		್ಷ್ 🗆 Estimated
ИИ	1.25 inch diameter, Schedule 40 PVC	Installation Date(s)Marc	ch 13, 1993
KIKI	☐ Backfill Portland Cement/	Drilling MethodUnkr	nown
	Grout Bentonite Grout	Drilling ContractorEcol	ogy & Environment, inc.
ИИ		Drilling FluidUnkr	
ИИ	_5.5_ft*		
		Development Technique(s) and D	ate(s)
	Bentonite Slurry 6.0 ft* pellets	<u>Unknown</u>	<u> </u>
	II penets		
		· · · · · · · · · · · · · · · · · · ·	
	6 E 114	Fluid Loss During Drilling	Unknown gall
	<u>6.5</u> ft*		ent <u>Unknown</u> gali
	_ Well Screen.	Static Depth to Water	Inknown feet below N
	1.25 inch diameter PVC 0.010 slot	Pumping Depth to Water	inknown feet below N
		Pumping Duration <u>Unknown</u>	hours
	Gravel Pack	Yield NA gpm	Date NA
	Sand Pack	Specific CapacityNA	
	Formation Collapse	Well Purpose Hydrogeolog	ic Investigation
	11.5 ft*		
	12.0 ft.	Remarks	
			truction log accompanied
			ll information recorded on
	Measuring Point is		roduced from E&E's 1983
	op of Well Casing Inless Otherwise Noted.	(May 23) report.	
•	Depth Below Land Surface		

Prepared by _

Kipper W. Montgomery

GERAGHTY

& MILLER, INC.

Environmental Services

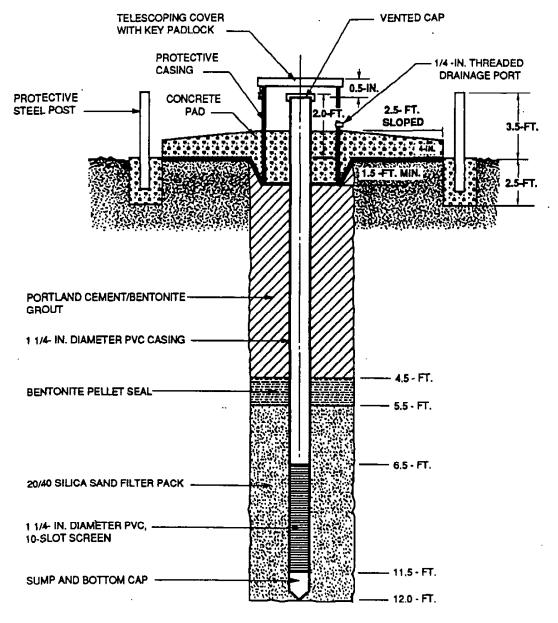
# TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-32

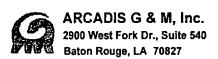
PROJECT

CHEVRON CHEMICAL CO. Belle Chase, Louislans



NOT TO SCALE

NOTE: All Depth Measurements in Feet Below Ground Surface



# **SAMPLE / CORE LOG**

Boring	/We	II: N	/W-28	BR	Project No.: Chevron Oronite C	· · · · · · · · · · · · · · · · · · ·	01			age 1 of 1
Site Location: Belle Chasse, Louisiana						Drilling Started: 10-01-01 1028  Drilling Completed: 10-01-01 1145			0-01-01 1145	
Land-Surface Elev.: NA Surveyed:NA Estimated:						NA D	atum:_N	NA.		
Drilling	, Flu	ild:	Nor	10		D	rilling M	ethod Used	: Hollow St	em
Drilling Contractor: Fugro Geosciences						Driller: NA	-	·	er: NA	
Drilling Contractor. Pogro Geosciences						Hammer Hammer				
N7970		lу <u>:</u>		ontgom	CTTO ESTE	_ Weight: <u>NA</u>			(inches):_	NA
∰Fill				Silty Cla	CTTD ERROR	Silty Sand		etate Sleeve		irst Encountered
Cla	<u>у</u>		<u>//</u>	Sandy C	Clayey Silt Sand	Clayey Sand	Spl	it Spoon	▼ Water Lo	evel After 10 Minutes
SAMPLE DEPTH	SAMPLE	TYPE	RECOVERY (ft)	SYMBOL	VISUAL		USCS (LL/PL/PI)	PP	OVM	REMARKS
SAN	\\\	;	RECC.	SX.	DESCRIPTION		SU T	H V	(wo) (w)	REM/
	-				SILTY CLAY: brown/gray with red brown, trace of damp	of sand (fill clay), soft,				
1 2	1111				autip		# #	<u>:</u>		
3	1111		4.0				ii			
4	1	İ			- dark gray, organic rich			•		
5					SANDY SILT: dark gray with abundant natural o damp	rganics, sandy silt w/cl	lay, 📗			
6	4				SILTY CLAY: gray blue, abundant natural organi	ics, soft		•		
7	4		5.0							
8	1						i			
9	1				SAND: gray seam					
10		П			SILTY CLAY: light gray, clay in shoe, soft, wet		 			<b>x</b>
11	.11.				CLAY: brown gray w/natural organics, stiff, damp	P				
12	1		5.0				li			
13	-				- wood fragments (cypress), within gray, soft, sti	cky clay, wet				·
14	1111							•		
16	Jan				- blue gray, abundant wood fragments, silt lamin	ations, soft	<u>.</u>			
17	1						i			
18	1		5.0							
19	4				CANDY BUT have a found and wat		i		Į	_
 20	1				SANDY SILT: trace of sand, soft, wet					立
21	-				SILTY SAND: gray, very fine, wet					
22	1		3.0							
23	1	•			CLAYEY SAND: gray, trace of silt, trace of nature TOTAL DEPTH - 23 ft bis	ral organics, soft				
24	1									

Louisiana

State

MW-28R

Well

Surveyed Estimated

.

1000

- Second

S.

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The State of

ye.

]

Replacement Monitoring Well (Upper Clay Zone) Top of casing elevation - 9.78 ft NGVD Chevron Oronite Co./LA002147.0001 Belle Chasse 10-1-01 and 10-2-01 K. Montgomery A Z hollow stem 10.52 ft bls Development Technique(s) and Date(s) Water Removed During Development gpm feet Fugro None Fluid Loss During Drilling None Plaquemines 7.96 NGVD Pumping Depth to Water Land-Surface Elevation Static Depth to Water Hand bailed - 10-2-01 Prepared by Installation Date(s) Drilling Contractor Pumping Duration Specific Capacity Drilling Method County/Parish Permit Number Well Purpose Drilling Fluid and Datum Town/City Remarks Project Yield clay/Portland cement) (4% bentonite Measuring Point is Top of Well Casing Unless Otherwise Noted. slurry Formation Collapse __Well casing, inch diameter, inch diameter inch diameter Gravel Pack Sand Pack 0.010 >∐ Backfill ► Grout cement ŧ 14.0 ft* ŧ. ŧ. ŧ. 8 ir drilled hole Well Screen, > Bentonite Land Surface 16.0 23.0 23.0 18.0 PVC, ¥ ARCADIS G&M

feet below M.P. feet below M.P.

hours Date

gpm/ft

gallons gallons

None

Chevron/LABO2147/Logs/WCL/bbk

Depth Below Land Surface

Date Drilled: 3/12/83

Location: North side of Landfarm C

Stratigraphy:

0 to 3 ft dark brown clay fill

3 to 7 ft gray mottled brown clay; dense

7 to 9 ft soft gray silty clay with roots and twigs

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.55 ft above ms1.

MW-27

Date Drilled: \3/12/83

Location: Northwest corner of Landfarm C

Stratigraphy:

O to 4 ft brown clayey fill with shells

4 to 8.5 ft gray mothled brown clay

8.5 to 10 ft gray clayey silt to silty clay with roots and twigs; black oil discoloration

10 to 12 ft as above, but without oil discoloration. Last 1 ft. of hole collapsed

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 12 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.37 ft above msl.



(UNCONSOLIDATED)

		Project Chevron	WellMW-26
	2 ft	Town/CityBelle Chasse	
	LAND SURFACE	County Plaquemine	
	A A	Permit No. NA	_
•	<u>Unknown</u> inch diameter	Land-Surface Elevation	
	drilled hole	and Datum 10.55 feet (ms1)	☐ Surveyed
•	Well casing,		☐ Estimated
	1.25 inch diameter,	Installation Date(s) March 12, 1	983
	Schedule 40 PVC  Backfill Portland Cement/	Drilling Method Unknown	
•	Grout Bentonite Grout	Drilling Contractor Ecology & E	
		Drilling FluidUnknown	· · · · · · · · · · · · · · · · · · ·
	2.5 ft		
_	π 2.5_π	Development Technique(s) and Date(s)	•
	Bentonite	Unknown	
	3.0 ft* ■ pellets		
,	7.6	Fluid Loss During Drilling Unknow	n gallo
	3.5ft*	Water Removed During Development	Unknown gallo
	Well Screen.	Static Depth to WaterUnknow	
	1.25 inch diameter PVC 0.010 slot	Pumping Depth to Water NA	feet below M
	, <u></u> , <u></u>	Pumping Duration NA hours	3
	Gravel Pack	Yield NA gpm	Date NA
	Sand Pack	Specific Capacity NA g	
	Formation Collapse	Well Purpose Hydrogeologic Inve	<u>stigation</u>
	8.5 ft*		
	9.0 ft*	Remarks	
		No original well construction	
		E&E's 1983 report. All inform	
	Measuring Point is	this document was reproduced f	rom E&E's 1983
	Top of Well Casing Unless Otherwise Noted.	(May 23) report.	
	*Depth Below Land Surface	Brongrad by Kipper W. M.	ontoomerv
	·	Prepared by http://www.ni	3 )

Prepared by ___

Date Drilled: 3/12/83

Location: North side of Landfarm C

Stratigraphy:

O to 3 ft dark brown clay fill

3 to 7 ft gray mothled brown clay; dense

7 to 9 ft soft gray silty clay with roots and twigs

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.55 ft above ms1.

MW-27

Date Drilled: 3/12/83

Location: Northwest corner of Landfarm C

Stratigraphy:

O to 4 ft brown clayey fill with shells

4 to 8.5 ft gray mottled brown clay

8.5 to 10 ft gray clayey silt to silty clay with roots and twigs; black oil discoloration

10 to 12 ft as above, but without oil discoloration. Last 1 ft. of hole collapsed

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 12 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 10.37 ft above msl.



(UNCONSOLIDATED)

الما عبر الما عبر	Project Chevron Well MW-27
2 ft LAND SURFACE	Town/City Belle Chasse
LAND SURFACE	County Plaquemine State LA
ИИ	Permit No. NA NA
<u>Unknown</u> inch diameter	Land-Surface Elevation
drilled hole	and Datum 10.37 feet (ms1) Surveyed
Well casing,	@ Estimated
	Installation Date(s) March 12, 1993
Schedule 40 PVC	Drilling Method Unknown
Backfill Portland Cement/ Grout Bentonite Grout	Drilling Contractor <u>Ecology &amp; Environment</u> , Inc.
Gloss	Drilling Fluid Unknown
ИИ	
Bentonite □ slurry  5.5 ft* ■ pellets	Development Technique(s) and Date(s) Unknown
	Fluid Loss During Drilling Unknown gallo
	Fluid Loss During Drilling Unknown gallo  Water Removed During Development Unknown gallo
6.0ft*	
Well Screen.  1.25_ inch_diameter	Water Removed During Development <u>Unknown</u> gallo
Well Screen.	Water Removed During Development <u>Unknown</u> gallo Static Depth to Water <u>Unknown</u> feet below M
Well Screen.  1.25 inch diameter  PVC , 0.010 slot	Water Removed During Development <u>Unknown</u> gallo Static Depth to Water <u>Unknown</u> feet below M  Pumping Depth to Water <u>Unknown</u> feet below M
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack  Sand Pack	Water Removed During Development <u>Unknown</u> gallo Static Depth to Water <u>Unknown</u> feet below M Pumping Depth to Water <u>Unknown</u> feet below M Pumping Duration <u>NA</u> hours
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack	Water Removed During Development <u>Unknown</u> gallo Static Depth to Water <u>Unknown</u> feet below M Pumping Depth to Water <u>Unknown</u> feet below M Pumping Duration <u>NA</u> hours  Yield <u>NA</u> gpm Date <u>NA</u>
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack  Sand Pack	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack  Sand Pack	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack Sand Pack Formation Collapse	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours Yield NA gpm Date NA Specific Capacity NA gpm/ft Well Purpose Hydrogeologic Investigation Remarks
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack Sand Pack Formation Collapse	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft  Well Purpose Hydrogeologic Investigation  Remarks No orginial well construction log accompanied
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack Sand Pack Formation Collapse	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft  Well Purpose Hydrogeologic Investigation  Remarks No orginial well construction log accompanied E&E's 1983 report. All information recorded on
Well Screen.  1.25 inch diameter  PVC , 0.010 slot  Gravel Pack Sand Pack Formation Collapse	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft  Well Purpose Hydrogeologic Investigation  Remarks No orginial well construction log accompanied E&E's 1983 report. All information recorded on this document was reproduced from E&E's 1983
Well Screen.  1.25 inch diameter PVC , 0.010 slot  Gravel Pack Sand Pack Formation Collapse  11.0 ft* 12.0 ft*	Water Removed During Development Unknown gallo Static Depth to Water Unknown feet below M Pumping Depth to Water Unknown feet below M Pumping Duration NA hours  Yield NA gpm Date NA Specific Capacity NA gpm/ft  Well Purpose Hydrogeologic Investigation  Remarks No orginial well construction log accompanied E&E's 1983 report. All information recorded on

Prepared by _

*Depth Below Land Surface

Kipper W. Montgomery

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#### MW-20

Date Drilled: 3/11/83

Location: South side of Oreco Park, near MW-2

Stratigraphy:

O to 4 ft dark brown clay.

4 to 6.5 ft dark gray, mottled brown clay.

6.5 to 9 ft dark gray clay, dense, slightly moist at bottom.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 12 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 7.18 ft above msl.

#### MW-21

Date Drilled: 3/11/83

Location: West end of Landfarm B

Stratigraphy:

O to 4 ft dark-brown clayey fill, rags at 3 feet

4 to 6 ft gray silty clay

6 to 9 ft brown to gray fill, roots at 6 ft, brown fibrous matter
(filters?), and at bottom, green filter cake with fibers.
Visible black oil at 7.5 ft.

#### Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 5.91 ft above msl.

MONITOR-WELL NO. **∀**GERAGHTY TYPICAL MW-20 & MILLER, INC. MONITOR-WELL CONSTRUCTION PROJECT Environmental Services CHEVRON CHEMICAL CO. DIAGRAM Belle Chase, Louisiana TELESCOPING COVER **VENTED CAP** WITH KEY PADLOCK **PROTECTIVE** 1/4 -IN. THREADED CASING -**DRAINAGE PORT** 0.5-IN. **PROTECTIVE** CONCRETE 2.5- FT. STEEL POST PAD SLOPED 6 - IN. DIAMETER BOREHOLE PORTLAND CEMENT/BENTONITE GROUT 1 1/4- IN, DIAMETER PVC CASING -- 2.0 - FT. SUGAR SAND SEAL -2.5 - FT. 3.0 - FT. 20/40 SILICA SAND FILTER PACK 1 1/4- IN. DIAMETER PVC. 0.008-SLOT SCREEN 8.0 - FT. SUMP AND BOTTOM CAP 9.0 - FT. NOT TO SCALE

NOTE: All Depth Measurements in Feet Below Ground Surface

MONITOR-WELL NO. **✓**GERAGHTY **TYPICAL** MW-21 & MILLER, INC. MONITOR-WELL CONSTRUCTION **PROJECT** Environmental Services CHEVRON CHEMICAL CO. DIAGRAM Belle Chase, Louisiana TELESCOPING COVER **VENTED CAP** WITH KEY PADLOCK **PROTECTIVE** 1/4 -IN. THREADED CASING -DRAINAGE PORT 0.5-IN **PROTECTIVE** CONCRETE STEEL POST PAD -SLOPED 6 - IN. DIAMETER BOREHOLE PORTLAND CEMENT/BENTONITE GROUT 1 1/4- IN, DIAMETER PVC CASING -- 2.0 · FT. SUGAR SAND SEAL 2.5 - FT. 3.0 - FT. 20/40 SILICA SAND FILTER PACK 1 1/4- IN. DIAMETER PVC, 0.008-SLOT SCREEN 8.0 - FT. SUMP AND BOTTOM CAP 8.5 - FT.

NOTE: All Depth Measurements in Feet Below Ground Surface

NOT TO SCALE

LA171.02-MW-21

Date Drilled: 3/12/83

Location: East end of ditch on south side of Landfarm B

Stratigraphy:

O to 3 ft gray-brown fill material including clay and shells

3 to 7.5 ft gray clay, mottled brown, dry

7.5 to 8.5 ft some clay, but softer and wet, some silt stringers also. This bottom foot caved upon withdrawal of the augers.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 11.46 ft above msl.

MW-23

Date Drilled: 3/12/83

Location: East end of Landfarm B, near MW-1

Stratigraphy:

0 to 3 ft dark gray-brown fill

3 to 5 ft gray clay interbedded with gray silty clay, both mottled brown

5 to 9 ft gray mottled brown silty clay and clayey silt, trace fine sand. Especially silty, sandy zone at 7 ft.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 1.5 ft. Top of PVC casing elevation is 8.75 ft above msl.

MONITOR-WELL NO. *▼***GERAGHTY TYPICAL** MW-22 & MILLER, INC. MONITOR-WELL CONSTRUCTION PROJECT CHEVRON CHEMICAL CO. Environmental Services DIAGRAM Belle Chase, Louisiana **VENTED CAP** TELESCOPING COVER WITH KEY PADLOCK PROTECTIVE 1/4 -IN, THREADED CASING -DRAINAGE PORT 0.5-IN. PROTECTIVE CONCRETE STEEL POST 1.5- FT. PAD SLOPED PORTLAND CEMENT/BENTONITE GROUT 1 1/4- IN. DIAMETER PVC CASING . 2.0 - FT. BENTONITE PELLET SEAL-2.5 - FT. 3.0 - FT. 20/40 SILICA SAND FILTER PACK 1 1/4- IN. DIAMETER PVC, 0.008-SLOT.SCREEN 8.0 - FT. SUMP AND BOTTOM CAP 7. 8.5 - FT. NOT TO SCALE NOTE: All Depth Measurements in Feet Below Ground Surface LA171.02-MW-22

Date Drilled: 3/12/83

Location: East end of ditch on south side of Landfarm B

Stratigraphy:

O to 3 ft gray-brown fill material including clay and shells

3 to 7.5 ft gray clay, mottled brown, dry,

7.5 to 8.5 ft some clay, but softer and wet, some silt stringers also.

This bottom foot caved upon withdrawal of the augers.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 3 ft. Top of PVC casing elevation is 11.46 ft above ms].

MW-23

Date Drilled: 3/12/83

Location: East end of Landfarm B, near MW-1

Stratigraphy:

O to 3 ft dark gray-brown fill

3 to 5 ft gray clay interbedded with gray silty clay, both mottled brown

5 to 9 ft gray mottled brown silty clay and clayey silt, trace fine sand. Especially silty, sandy zone at 7 ft.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 1.5 ft. Top of PVC casing elevation is 8.75 ft above ms1.

GERAGHTY & MILLER, INC. Environmental Services

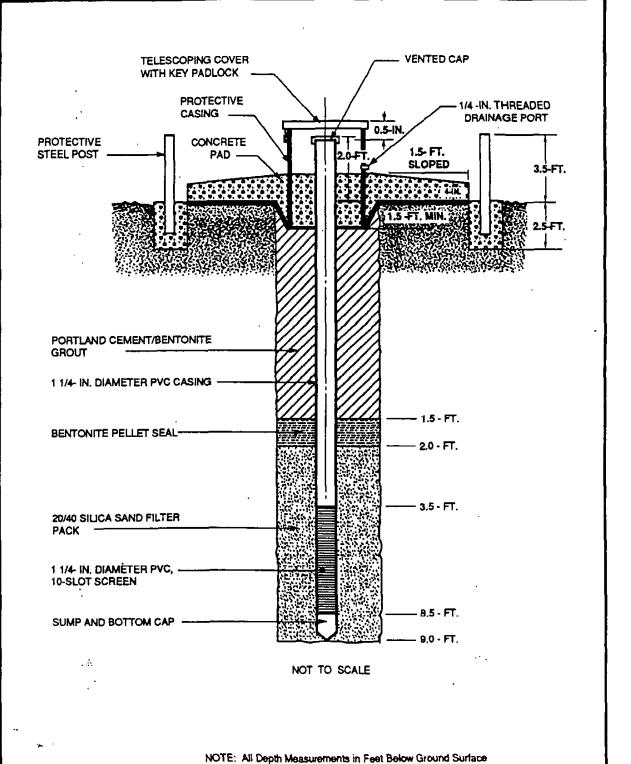
#### TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-23

PROJECT CHEVRON CH

CHEVRON CHEMICAL CO. Belle Chase, Louisians



A171.02-MW-22

Date Drilled: 3/12/83

Location: North side Landfarm A, west of Oreco Park, near MW-3

Stratigraphy:

O to 3 ft dark gray-brown clay fill with shells

3 to 4 ft very wet sandy, clayey silt with shells

4 to 6 ft dense gray mottled brown clay

6 to 9 ft moderately dense gray clay with plant roots and woody fibres; no mottling

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 6.65 ft above msl.

MW-25

Date Drilled: 3/12/83

Location: East end of Landfarm C, near MW-9

Stratigraphy:

O to 3 ft dark brown clay and shell fill

3 to 7 ft gray mottled brown dense clay

7 to 14 ft soft clayey, sandy silt; wet. Last 1 ft of hole collapsed upon auger removed.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 10 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 12.16 ft above msl.

Date Orilled: 3/12/83

Location: North side Landfarm A, west of Oreco Park, near MW-3

Stratigraphy:

O to 3 ft dark gray-brown clay fill with shells

3 to 4 ft very wet sandy, clayey silt with shells

4 to 6 ft dense gray mottled brown clay

6 to 9 ft moderately dense gray clay with plant roots and woody fibres; no mottling

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 6.65 ft above msl.

#### MW-25

Date Drilled: 3/12/83

Location: East end of Landfarm C, near MW-9

Stratigraphy:

O to 3 ft dark brown clay and shell fill

3 to 7 ft gray mottled brown dense clay

7 to 14 ft soft clayey, sandy silt; wet. Last 1 ft of hole collapsed upon auger removed.

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 10 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 12.16 ft above msl.

GERAGHTY & MILLER, INC.

Environmental Services

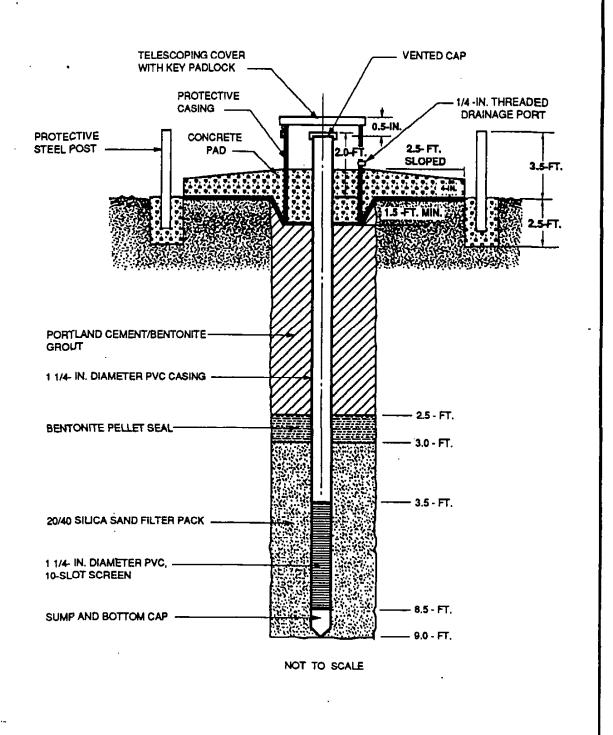
# TYPICAL MONITOR-WELL CONSTRUCTION DIAGRAM

MONITOR-WELL NO.

MW-24

PROJECT

CHEVRON CHEMICAL CO. Belle Chase, Louisians



NOTE: All Depth Measurements in Feet Below Ground Surface

LA171.02-MW-24

Date Drilled: 3X12/83

Location: North side Landfarm A, west of Oreco Park, near MW-3

Stratigraphy:

O to 3 ft dark gray-brown clay fill with shell's

3 to 4 ft very wet sandy, clayey silt with shells

4 to 6 ft dense gray mottled brown clay,

6 to 9 ft moderately dense gray clay with plant roots and woody fibres; no mottling

Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 5 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2 ft. Top of PVC casing elevation is 6.65 ft above msl.

#### MW-25

Date Drilled: 3/12/83

Location: East end of Landfarm C, near MW-9

Stratigraphy:

O to 3 ft dark brown clay and shell fill

3 to 7 ft gray mottled brown dense clay

7 to 14 ft soft clayey, sandy silt; wet. Last I ft of hole collapsed upon auger removed.

#### Well Construction:

Installed 5 ft of 1.25-inch PVC screen and 10 ft of 1.25-inch PVC casing. Put 6 inches coarse sand in bottom of boring, then screen and casing, then sand to 6 inches above the screen, then 2-inch bentonite seal, and cement grout to surface. Installed 4-inch steel casing protector around PVC casing. Stick-up is 2.5 ft. Top of PVC casing elevation is 12.16 ft above msl.



(UNCONSOLIDATED)

	Project Chevron C	Chemical	Wedl MW_	25
ft 2.5	Town/CityBelle			
LAND SURFACE	County Plaqu		State LA	
ИИ	Permit No. NA			
Unknown inch diameter	Land-Surface Elevation		<del></del>	
drilled hole	and Datum 8.55		□ Surveyed	
Well casing,			□ Estimated	
1.25 inch diameter,	Installation Date(s)	March 12,	T.1	_
Schedule PVC Backfill Portland Cement/	Drilling Method			
Grout Bentonite Grout	Drilling Contractor			
	Drilling Fluid			
Bentonite ☐ slurry 8.0 _ft* ■ pellets	Development Technique (Unknown)	e(s) and Date(s)		
	Fluid Loss During Drilling	9NA	<u> </u>	gall
8.5 ft*	Water Removed During I			gall
Well Screen.	Static Depth to Water _	Unknown	1f	eet below N
1.25 inch diameter PVC , 0.010 slot	Pumping Depth to Water			et below N
	Pumping Duration		S	
Gravel Pack	Yield NA	•		<u> NA _</u>
Sand Pack Formation Collapse	Specific Capacity			
Formation Collapse	Well Purpose Hyd	rogenlogic Inv	estigation	
13.5 ft*				
13.5 ft*	Remarks		<u> </u>	
1	No original wel	l construction	log accompar	nied
	E&E's 1983 repo			
Measuring Point is	this document		from E&E's	1983
Top of Well Casing Unless Otherwise Noted.	(May 23) report	•		

Prepared by _

*Depth Below Land Surface

Kipper W. Montgomery

	BORING LOG							
	PROJECT NAME Chevron . PROJECT NUMBER L495BCQ PAGE OF LOGGED BY L. Cohen APPROX. ELEV BORING NO. MW-45							
COORDINATES				·			DRILLING METHOD MUN RODEY DATE STARTED 9-25-85	
) G	GWL: DEPTHACTUAL TIME DATE COMPLETED 1-25-85							
	CASING INFORMATION GROUNDWATER LEVEL DATA  SIZE DEPTH ACTUALTIME DEPTH ACTUALTIME DEPTH							
	2* OPVC +2.5-17.5 B*OPK SCHOLIT.5 =22.5 2* OPVC SUMD 22.6-25.5							
		į	2.0	PYC SU TPO	NH 33	.5-25.	5· <del>5</del>	
DEPTH	SAMPLER	SANDLE NO.	AND TYPE	STRATA LOG	US.C.S. STWBOL	E MERSUMED ACOMBISTENCY A (TSF)	DESCRIPTION  ape(tons/c+2)	
	}		AUGG				FILL	
3 -	65	S-1	朴			0.57		
6	80	5-2				58.0	CLAY, sally micaceous, he-rich, black organics, med. 88eu in brown mottling, moist.	
<u> ۹</u>	100	1-	H				9 CLAY, silty, micaceous, grey some brown, some black	
12	90	S-3				0.25	CLAY, Silty and Sand, clayey, micaceous, grey, soft, wet	
-/5 -	95	_	3			10.10	/5	
	85		shelby.				15-16 AS ABOVE. 16-20 SAND, Micaceous, med. grain, med. grey, wet	
20-			П				20-23.5 SAND as above	
<u> </u>	80						235-25 SAND AND CLAY, SITY ME alternating layers,	
-25-	80			-			SAND & lenses day and clayey sand, med grain, med grey, some shells, wet to moist	
							- 145 bentonite  15.5 sugar sand  16.6 20/40 sand  17.5 > screen  22.5 > sump + point  25.5 Plugged back totaldepth	
NOTE  TRACE 0 - 5 % -  LITTLE 5 - 12 %  SOME 12 - 30 %								



(UNCONSOLIDATED)

П т	Project Chevron - L0495BC2	Well MW-45
ft 2.5	Town/City Belle Chasse	
T LANG SURFACE	County Plaquemine s	State LA
ИИ :	Permit No. NA	
6 inch diameter	Land-Surface Elevation	
drilled hole	and Datum NA feet	Surveyed
Well casing,		Estimated
inch diameter,	Installation Date(s) September 25, 1	
Schedule 40 PVC	Drilling Mathed Mud Rotary	
Backfill Portland Cement/ Bentonite Grout	Drilling Contractor Eustis Engineer	
5-10% Bentonite	Drilling FluidMud/Water	
14.5 n		
7 14.2 π	Development Technique(s) and Date(s)	•
Bentonite ☐ sturry  15.5 ft* ■ pellets	Airlift & surge - September, 198	5
sugar sand		
<b>M</b>		
20-40 sand 17.5 ft*	Fluid Loss During Drilling Unknown	galic
"	Water Removed During DevelopmentUnk	<del>-</del>
Well Screen.	Static Depth to WaterUnknown	
2 inch diameter PVC , 0.010 slot	Pumping Depth to Water Unknown	feet below M
	Pumping Duration <u>Unknown</u> hours	
Gravel Pack	Yield <u>NA</u> gpm	Date <u>NA</u>
Sand Pack-	Specific Capacity NA gpm/ft	
Formation Collapse	Well Purpose Louisiana Hazardous Wa	ste Regulations
Gravel Pack Sand Pack Formation Collapse	Compliance Monitoring Wells	
		<del>.</del>
25.5 ft*	Remarks	
	Formed filled out with informati	OH TOM GAM
	12-30-85.	
Measuring Point is Top of Well Casing	<del></del>	···
Unless Otherwise Noted.		
*Donth Below Lond C. ()	·	
*Depth Below Land Surface	Brongrad by Kipper W. Monto	omerv